CONCEPTION

Period of Women

Dr. K. Ogino, M. D.

SUGGESTIONS FOR READERS

1. The necessary information for the practical application of the Ogino-Knaus Biological Law of Nature is fully covered in Chapter No. 6. Table No. 19 showing the various cycles from 23 to 40 days and the calendar tables A to H are all that is necessary to determine the STERILE and FERTILE periods for women who are regular on their own cycle. Always count the first day of menstruation as the first STERILE day.

2. In Chapters No. 1 to 5 and 7 to 9, you will find a more technical explanation of the new Biological Law. These sections are for the use of the medical profession or for those readers who wish to make a thorough study of the subject. Read carefully the "Summary" of Dr. Miller's article at the end of the book showing the results of clinic observations of the Ogino-Knaus method.

3. The novelty of Dr. Ogino's discovery may cause some readers to hesitate about accepting it and putting it into practice, and the question may arise in their minds, "Why has this method not been discovered before?" This reaction is inevitable, and it will be recalled that when the model of the telephone was first exhibited at the Philadelphia Centennial in 1876, it was looked upon generally as merely a toy; moving pictures were first considered a passing fad; and when Carl Ludwig Schleich announced his discovery of local anesthesia at the Congress of Surgeons in 1898, every one of the 800 scientists present declared that such a thing was impossible. In each case, it has required time and patience to overcome opposition and to secure for these great discoveries, which have so vastly enriched human life, the recognition and general use they now enjoy. Dr. Ogino is an eminent scientist, and has not made his discovery public until he was absolutely certain of his ground. Every doubt and question which can arise in the public mind has already been anticipated, and his findings may be relied upon as thoroughly accurate.

4. Do not loan your book to friends, because a good book is never returned. You will want to refer to it from time to time and just when you need it most, it will not be available. Tell your friends all about the book but let them order a copy and study it thoroughly before making practical application of the method.

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Conception Period of Women

By

DR. KYUSAKU OGINO

Head of the Gynaecological Section of Takeyama Hospital, Niigata, Japan (Nippon)

English Translation by

DR. YONEZ MIYAGAWA

Director of Government Institute for Infectious Diseases, Tokyo Imperial University, Hongooku, Tokyo, Japan. June 6, 1934

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FOREWORD

Human conception can occur in a certain limited period between two menses (from the twelfth to the nineteenth day before the subsequent menses) and this conception period can be predicted practically in most cases.

Since 1924 I have advocated this view, which is just the reverse of the view heretofore expressed. Nevertheless, I was honored by being awarded the prize of the Japanese Gynecological Society in 1925. Since then, my view has been written and propagated in the medical and popular journals, and no objection has been found to it.

Since 1929, *Knaus* has several times reported independently a similar view concerning the conception period. At the time directly after the publication of my view in Die Zentralblatt für Gynecologie (1930, 1932), there appeared many opposing views communicated by authors, who have traditionally believed in the previous view. Notwithstanding this, *Smulders* (Holland), *Latz* (U. S. A.) and many others have approved my view and referred to it as *Ogino-Knaus's* theory or *Ogino's* theory, under which name it has since been propagated all over the world. There have appeared year by year many supporting results, all of which have been obtained as a result of accurate investigation, for example, *A. G. Miller's* thoroughgoing and extensive work (Miller Clinic, Hobart, Indiana, U. S. A.) and that of many others, all of which have supported the new theory. In March, 1934, the manager of the Medical Arts Publishing Company, wrote to me that my own manuscript concerning the period of human conception would be welcomed by the American people, notwithstanding the many books and papers along this line which have already been published there, and asked me earnestly for my own paper. In 1932, the editor of the Clinical Journal of Chilopody, etc., asked me again to write about my theory in the Journal of the American Medical Association. But I did not do that, because it was directly after its publication in die Zentralblatt für Gynekologie.

It is necessary to give a certain amount of attention to

the following point, namely, as to whether the explanation of the human conception period should be upheld from the standpoint of morality. There are now in existence eight different books in which this problem is treated. Among them are *Smulder's* book in Holland, *Latz's, O'Brien's, Coucke and Walsh's* books in America, these being permitted and approved by high authorities in the Catholic Church, as offering a solution of a difficult matter.

Why the human conception period should be limited to a certain period before the subsequent menses; the real facts concerned, and the method of prediction will be set forth in a popular manner in this book. If any specialist desires to know my exact views, they can be found in my monograph. (Kinoshita's Tokological-Gynecological Series, Vol. IX, 1934. Nankodo & Co. Tatsuokacho Hongo, Tokyo, Nippon).

The human conception period and the method of predicting it will be generally understood from this book. The person who desires the well being of his descendants, will give special attention to the conception period. The married couple who have been obliged to carry on a life of absolute abstinence or continued contraception for some reason or other, will be released from such restrictions by the application of the knowledge contained in this book. How and for what purpose the natural law explained in this book will be used will depend upon the conscience, individual needs and ideals of its readers. I write this paper with idealism, and hope that it will contribute this principle to married life.

DR. K. OGINO,
Niigata, Japan (Nippon).

April, 1934.

CONTENTS

CHAPTER I.

INTRODUCTION

The conception period of a woman means the time at which pregnancy starts as a result of sexual intercourse in the time between two menses. Pregnancy is the state of a woman who has within her a fecundated germ, which is the ovum (mother cell) united with a spermotozoon, (male sperm, father cell).

In general parlance, the female pelvic organs or female gonads consist of vagina, uterus or womb, Fallopian tubes, and ovaries on each side.

The size of an ovary is almost as large as that of the tip of a thumb. Inside it there are numerous egg cells, one of which will mature and be discharged every month in a mature woman. This phenomenon is called ovulation. The ovulated ovum is transported to the uterine cavity through the Fallopian tube.

The Fallopian tubes are slender canals, communicating with the uterus at one end, the other opening in the abdominal cavity near the ovary. The canal is the route by which pass the ovulated ovum and spermatozoa.

The uterus is pear-shaped. During the pregnant period the foetus is attached to its inner surface and nourished. In the nonpregnant mature woman, bleeding occurs almost once a month from the mucous membrane. It is called menstruation, menses, or monthly discharge. The vagina is an extensible canalic organ, and communicates with the uterus at the upper end, while the lower opens on the outer gonad.

Spermatozoa are microscopically small bodies shaped like a pin, and are actively motile. They are in large numbers in the male secretion or sperm discharged in the vagina at the time of the sexual act. They enter the uterine cavity in an active state, and thence through the Fallopian tube into the abdominal cavity, after two or three hours.

As stated above, the ovulated ovum comes down the Fallopian tube toward the uterus and unites with one of the spermatozoa, which comes up to the tube through the uterus,

and from then on pregnancy begins. The vitalizing action of the male element on the ovum is generally considered to take place in a part of the ampulla tubae. The vitalized ovum which is said to be fertilized, becomes divided and multiplies to the morular stage, with the form of a mulberry, during its transportation through the Fallopian tube, and reaches the uterus about seven days later. Then three days after that, it comes into contact with the mucous membrane through the superficial layer of the uterus. The phenomenon is designated the implantation of the fertilized ovum, and at that time conception comes into full existence.

Regarding the mating time, let us look at the mammals. With the exception of monkeys, they all have a certain heating period and only at that time does the female allow the male to mate.

Consequently the gravidity of mammals takes place only in the mating period. But nature has given to the human race no special oestrous period, and therefore human beings have no limit restricting the sexual act. There is, however, a question as to whether human conception takes place at any time, whenever the sexual act is carried out.

According to the generally accepted view, the woman can conceive at any time between her two menses and consequently has no sterility period. The highest percentage of conception falls on the 7th day or thereabouts after the beginning of the menses. This has been a firm belief and a traditional doctrine from the view point of clinical observation ever since the founding of medical science.

According to my own view, there is some delusion in the judgment made from the traditional idea, which holds that the woman has no sterility period. There is also an error in the statistical data which give the conception optimum period as being that directly after the menses. The woman has a fertility and sterility period between menses, following a certain biological law. The conception period (fertility period) is 8 days in length, occurring between the 12th and the 19th day before the coming menses, notwithstanding the length of the menstrual periodicity.

In order to explain how I have come to this conclusion, I must take up the following phenomena, namely (a) ovulation, (b) the length of time that fertilizing ability is retained by the ovulated ovum, and (c) by the spermatozoa discharged in the female gonads, from the standpoint of theoretical and clinical investigations on the conception period.

If it were possible for ovulation to occur at any time in

the intervening stage between menses, human conception might be brought about at any time, and consequently the woman would have no sterility period.

On the contrary, if ovulation could occur only at a certain period, the human conception time would vary, depending on the length of time that fertilizing ability is retained by the spermatozoa and the ovum. The theoretical conclusion should be supported by clinical observations.

Taking up three above mentioned problems, the results reported by various authors and as a result of my own research will be at first briefly stated, and my own idea will be described, with contributions from supporters and opponents of the theory.

Pointing out the defects in the latters' ideas, the scientific basis of my own theory will be clarified. Then the method of estimating the human conception period will be described in a popular style. The method of applying the estimating scales, the expectation of certainty in practice, and the real value of the theory in human life will be stated.

In my description, the first three chapters are very scientific, and therefore they may be difficult for general readers to understand. But at the end of each chapter a rèsumè is given in a popular style, in order that the general idea may be easily grasped.

In the present communication, a few of my own hitherto unpublished results are described, along with the already published ones. Therefore I hope that the special investigators will give this paper their careful consideration.

CHAPTER II.

THE PERIOD OF OVULATION.

1. General idea of ovulation (ovum discharge).

The investigation of the ovulation period is, as mentioned above, an important problem of the three concerning the determination of the conception period. The time of ovulation means the period at which the ovum is discharged from the ovary in the term between the last and the coming menses. Regarding the estimation of the ovulation period, there are two methods, namely the calculation from the last menses, and from the next coming one. There would be no actual difference between the two methods if the number of days of menstrual periodicity was the same. As it is a fact, that there is more or less difference in the length of the

monthly course in each individual, the results calculated by the two methods show a certain discrepancy. It demands our prior attention to determine which method is the more suitable for the determination of the ovulation period.

It is quite important to determine, just in which period of the cycle the ovulation occurs. For this thesis, I have thoroughly investigated the changes in the pelvic organs, especially in the uterus and ovary at the time of the menses and ovulation, and have also studied the relevant literature, especially that of German and American authors. In the present paper, all these findings are described, after which it will be made clear that the ovulation period should be estimated from the next coming menses, the historical view regarding the ovulation term, and also my own view being stated.

2. Cyclic change of Endometrium.

In a mature woman, bleeding from the uterine mucous membrane occurs normally once a month, except during pregnancy and during the lactation period. This is the menstruation or menses, which lasts usually for a few days or a week.

In ancient times, the uterine mucous membrane was deemed to be in the same state in the menstrual and intervening periods, but only in the premenstrual term was hyperaemia in the membrane and subepithelial haemorrhage thought to occur, with consequent bleeding due to its rupture, and then a recovery of the normal state of the mucous membrane with cessation of hyperaemia.

However, *Hitschmann and Adler* in 1908, and from then on many investigators, especially *R. Schroeder,* discovered the following cyclic change in the mucous membrane, namely, proliferation, secretion, desquamation and regeneration, the first one being in the former, and secretion being in the latter half period of the normal cycle. Desquamation has been established as an anatomical finding from the beginning of the menses, and regeneration is a healing process during it. The mucous membrane in the secretion phase is prepared for the implantation of the fertilized ovum, and when pregnancy supervenes, it becomes what is termed decidua, and if pregnancy does not occur, it is desquamated, with consequent bleeding, a well known fact in medicine.

3. Cyclic change of Myometrium.

There is also a certain cyclic and functional change in

the uterine muscular layer, just as in the mucous membrane, this being seen by *Knaus* in 1929 and confirmed by *Wittenbeck* and *Nakamura*. In the mucous proliferation phase the uterine muscles are accelerated in active motility by the sexual hormon (Folliculin), and strengthened as regards excitability to pituitrin. On the contrary, in the secretion phase, they decline in excitability to pituitrin under the influence of progestin (luteohormon).

4. Cyclic change of ovaries.

In the ovaries there are a great number of follicles, each of which has within it an ovum. In the prepuberty stage, the follicle develops only up to a certain stage, but in the mature woman, one of the follicles is ripened almost once a month, then discharging the ovum with the rupture of the follicle, which is called ovulation. After ovulation, the follicle changes to the yellow body, lutein body or corpus luteum.

According to *R. Meyer's* researches, the process of corpus luteum formation is divided into three stages: proliferation, vascularisation and organisation. The corpus luteum begins to degenerate directly before the menses, and atrophies gradually, ending up finally as cicatrical tissue (corpus albicans).

On one hand, the development and ripening of a follicle, ovulation, lutein body formation, and its degeneration process are being carried on, and on the other hand, during the period of lutein body formation the ripening of another follicle is checked. The ovarian cyclic change as above stated is carried on in the healthy woman.

5. Correlation of periodical changes of the ovary and uterus.

The cyclic changes of the ovary and uterus do not proceed unrelated and unordered with respect to each other, but in a certain harmonised way, namely, the ripening stage of a follicle is responded to by the proliferation phase of the uterine mucous membrane; the corpus luteum formation stage to the uterine mucous secretion phase, and the degeneration phase of the corpus luteum to the uterine mucous desquamation and regeneration phase. The fact was discovered by *R. Meyer* and *R. Schroeder* in 1913, and thereafter has been confirmed by many scholars and by myself.

6. Internal Secretions of the Ovary.

The correlated cyclic changes of the ovary and uterus

are a result of the influence of the secretions of the ovary, which are of two kinds, the sexual hormon (Folliculin), and progestin (Luteohormon).

The sexual hormon has been studied by *Stockard Papanicolau* (1917), *Long Evans* (1922), *Allen* (1922), *Zondek & Aschheim* (1929), and by various other investigators, and has several actions, one of which is its action on the uterine mucous membrane as the actuating cause of the proliferation phase. It is secreted from the ovarial follicle. In the human being, the secreted quantum is increased at the time of follicular ripening, and increased to the greatest extent in the corpus luteum formation phase, while the secretion is stopped in the degeneration phase of the yellow body (*Zondek*).

Beside the sexual hormon, the corpus luteum hormon (progestin) is secreted from the ovary. The phenomenon of internal secretion of the lutein body was suggested by *Fraenkel* in 1904, proved positively by *Corner* and *Allen* in 1924 and approved by *Smith, Clauberg* and *Kaufmann,* etc.; and the nature of this hormon has been made clear. By the action of progestin, the secretion phase is provoked in the uterine mucous membrane.

From consideration of the above mentioned secretion actions, it is also clear that the ovary undergoes a cyclic change.

7. Ovary and the Anterior Lobe of the Pituitary Gland.

It is now clear that the morphological and functional cyclic changes of the endometrium and myometrium are caused by the periodical changes of the ovarial function.

How is the periodical change of the ovary brought about? It depends upon the internal secreting function of the anterior lobe of the pituitary gland, which was closely observed by *Smith-Engle* and *Zondek-Aschheim* in 1925-1927.

By the action of one of the secretions, namely, of the follicle ripening hormon (Prolan A) from the anterior pituitary lobe, the ovarian follicle is stimulated to develop to the ripening stage and to secrete the sexual hormon.

By the action of another hormon, namely of the luteinizing hormon (Prolan B) from the anterior pituitary lobe, the corpus luteum is formed. Therefore, the periodical of the ovary is governed by the anterior pituitary gland cycle.

If so, by what action will the periodical change of the

anterior pituitary gland be provoked? By certain authors (*Walter, Dohrn, Kuschinsky*) there was an attempt to explain it by suggesting the following phenomenon, namely that the accelerating secretion of sexual hormon may act as inhibitor on the anterior lobe of the pituitary gland.

8. Biological Significance of the Monthly Course.

According to the scholars at the beginning of this century, the menses period had the same meaning as the mating time of mammals, ovulation occurring during menstruation, and the fertilized ovum becoming implanted naturally in the postmenstrual endometrium. *Pfleuger* explained therefore that the menstrual flux was to be deemed as the natural bleeding from the wound preparing for the implantation of the fertilized ovum. But since *Fraenkel's* discovery of the internal secretion of the corpus luteum, *Hitschmann, Adler* and *R. Schroeder's* finding on the cyclic change of endometrium, and *R. Meyer, R. Schroeder's* demonstration of the close relationship between ovary and endometrium have been reported, it has been explained that there is no lutein body without ovulation, no premenstrual change without lutein body, and no menses without premenstrual change. The premenstrual change of the endometrium is to be seen as the pregravidal change, and as a preparation for the implantation of the fertilized ovum. If pregnancy therefore supervenes, the changed endometrium becomes decidua. If gravidity does not occur, then the premenstrual endometrium is desquamated and regenerated. Consequently the menses is to be considered as an abortion of the nonfertilized ovum.

According to *Hartman, Corner,* and *Allen's* finding on monkeys, they have ovulatory and non-ovulatory cycles in the physiological state. In the latter cycle, the endometrium shows only the proliferation phase and bleeding without the secretion phase. There is a discrepancy between the findings in the human being and in monkeys, namely, that in the case of humans there is no menstruation without the premenstrual change in the endometrium. A nonovulatory cycle such as that found in monkeys can be seen in a similar manner only in the human pathological state, namely, in policystic degeneration and follicle persistency of the ovary. The nonovulatory cycle is, of course, of a nongravidual nature, and therefore it has lesser meaning in the discussion of the conception period.

9. Direct cause of menstrual flux.

As stated above, the proliferation phase of the endome-

trium is provoked by the action of sexual hormon (Folliculin), and the secretion phase by luteohormon (progestin). If pregnancy does not occur, the endometrium in the secretion phase undergoes desquamation and shows bleeding. What is the cause of bleeding? Since *Meyer's* and *Schroeder's* researches, it is generally believed that the lutein body begins to degenerate directly before the beginning of the menses, and therefore the cessation of the corpus luteum function is to be regarded as the cause of the menstrual flux.

If that be so, which hormon from the lutein body, progestin or folliculin, is concerned with the menses? Or is it some other one? According to *Allen, Morrell* and *Saiki's* experimental results, the uterine bleeding in the nonovulatory cycle is deemed to be caused by folliculin action, and specifically the changed endometrium under the stimulus of this hormon bleeds through the discontinuance of this hormonal influence.

Smith-Engle (1932) injected pituitary anterior lobe hormon into mature monkeys for four days, then for the following four days injected folliculin, and then castrated them. For 28 days after the castration, they were inoculated with progestin, and then they showed a real menstruation on the sixth day after the last progestin injection, it being caused by desquamation of the premenstrual mucosa. From this fact it may be concluded that the real cause of the menses may be the progestin action, provoking the premenstrual change of the endometrium, the latter desquamating, and bleeding following on the stoppage of this hormal action.

Hartman said that the direct cause of the menses may be not in the corpus luteum action, but in the pituitary anterior lobe action. Unfortunately I have no experience on which to base any discussion of this problem. Generally speaking, it is said that the direct cause of the menses may be in the cessation of the corpus luteum action.

10. The ovulation period should be estimated from the forthcoming menses.

From the facts mentioned above, it is clear that in order that menstruation may be provoked as a physiological phenomenon in the mature woman, the cyclic change should take place in the uterus, under the influence of the periodical functional change of the ovary, which is brought about by the action of the pituitary anterior lobe. The ovarial follicle develops and comes to maturity under the action of the

prolan A from the pituitary anterior lobe hormons, this finally bringing about ovulation. After ovulation the corpus luteum is made under the control of prolan B, the other hormon secreted from the pituitary anterior lobe. The folliculin, hormon from the ovarial follicle, act upon the uterine mucosa, bringing the proliferation phase, and the progestin (hormon from the corpus luteum) acts also upon the uterine mucosa, causing the secretion phase, which is the so-called pregravidal mucous membrane, prepared for the implantation of fertilized ovum, changing to decidua, when the pregnancy occurs. If gravidity does not supervene, the pregravidal membrane is desquamated and bleeds as a result of the discontinuance of the secreting action of the corpus luteum, which is going into degeneration. This is the menstrual flux.

All things considered, there take place morphological and functional changes in the ovary and uterus with a certain periodicity, it being considered that they are prepared for pregnancy, from the biological view point. Menstruation indicates the failing of pregnancy, and is a sign of the end of each periodicity. Consequently it is quite evident that in the cyclic chain, ovulation has an inevitable relationship to the forthcoming menses, and it is reasonable that the ovulation period should be calculated from the next coming menses. It is a well known fact, and hardly needs explanation.

According to the views hitherto in vogue, it has been a custom to calculate the ovulation period from the beginning of the last menses, not giving much consideration to the differences of the length of menstrual cycles. It will be explained in the next chapter that this manner of calculation of the ovulation period is quite unreasonable.

11. The ovulation period as described in the literature.

Until the 18th century it was not recognized that there was any relationship between ovulation and menses. However it was considered that ovulation would be provoked at any time by the stimulus of the sexual act.

In the 19th century a certain relationship between ovulation and menses was considered and the menses was regarded as the same phenomenon as the oestrus of mammals. In animals, ovulation occurs at the mating times, and therefore it was considered that in the human being the ovum would be discharged at almost the same period as

menstruation, but this idea was completely refuted in this century.

Since the publication of *Fraenkel's* corpus luteum theory, the study of the ovulation period has been carried on in various ways, namely, by microscopic observation on the ovary at the time of laparatomy, histological and comparative investigation of the ovary and endometrium, and statistical and comparative studies on embryonal development, but the findings as made by various authors were not in accord, opinion being divided pratically into four groups. *Fraenkel* concluded from the findings of laparatomy that the hyperaemic and swollen state of the corpus luteum should be regarded as the one existing directly after ovulation. From this result, he concluded that the ovulation period is in the days between the 11th and 26th day after beginning of the menses, usually from the 18th to the 19th day. *Tschirdewahn, Halban, Koehler, Miller, Trippel,* etc. hold nearly the same view as *Fraenkel. Fraenkel* said recently (1931) that the ovulation period corresponds to the term between the 8th and 26th day after the beginning of menstruation. From comparative investigation on the corpus luteum and endometrium, *Meyer and Ruge* came to the conclusion that the ovulation period is the time between the 8th and the 14th day after the beginning of the monthly discharge. From the same researches, *Schroeder* obtained a different result from *Meyer* and *Ruge,* the ovulation period being considered by him to be in the term between the 14th and 16th day after the beginning of mentsruation, if the woman has a regular course of the menses of the 28 days type. This theory is supported by *Reusch, Marcotty, Seitz, Wintz, Malinowski,* etc. and is adopted in the textbooks. *Knaus* in 1929 studied the ovulation period by application of the fact discovered by him, that uterine muscles were inhibited as regards excitability to pituitrin under the influence of the corpus luteum hormon, and discovered that the ovulation period was the time between the 14th to the 16th day after the beginning of the menses, if the latter were of the 28 days type, confirming *Schroeder's* theory.

According to the view, that the fertilization of the ovum will occur directly after ovulation, *Grosser* in 1914 studied the development and made comparative observations on many embryos, and was able to find out the ovulation term, which would fall between the 4th and 24th day after beginning of the menses, and he concluded therefore that ovulation would occur at any time between two menses. *Zangen-*

meister, Schickele, etc. are of the same view as he.

The views concerning the ovulation period stated above were held by scholars at about the time of the great European War. Reviewing them we find that the ovulation period is seen to occur in the highest percentage on about the 15th day after the onset of menstruation; but it should be considered that ovulation can happen at any time during the menstruation cycle. If this view be true, there is no harmony, but only confusion regarding the physiological phenomena, especially concerning the periodical changes of the ovary and endometrium, and the significance of the menses and its flux. In order to introduce order into this confusion, it is quite necessary to reconsider just how to estimate reasonably the ovulation period. In the methods for estimation of the ovulation period which have hitherto been used, the forthcoming menses has not been applied as the standpoint for calculation, but only the days after the beginning of the last one were used, for the conventional reason. This is the first defect. The number of days after the beginning of the menses were used to show the ovulation period, and there was neglect of any consideration of the length of the menstrual periodicity, the 28 days type being used as standard. This is the second defect. In order to determine the conception period it is a quite important matter to make more reasonable studies on the ovulation period, eliminating the above mentioned sources of error.

12. My own Observation (1).

At the time of laparatomy, I have made observations on ovaries on both sides in 132 cases, especially on the corpus luteum (from the proliferation phase to the blooming phase) and the nonovulated ovaries, and have obtained the following results concerning the ovulated and nonovulated ones, without regarding the length of the menstrual periodicity.

As shown in Table I, the nonovulated ovaries are seen mostly on or about the 16th day after the beginning of the menstruation and thereafter decreased in number, but were found even on the 28th day, or later still. The developed corpora lutea are seen between the 11th and 34th day after the beginning of the menses. From this fact, if one intended to determine the ovulation period in terms of the days after the beginning of menstruation, without taking into consideration the length of the menstrual cycle, one would find, that ovulation would occur at any time between two menses and that the highest percentage would fall on

about the 10th day, on the 15th day, or on the 18th day, depending on the research materials. Thus it may be seen clearly that this estimation method is not reasonable.

13. My own Observation (2).

On the occasion of laparatomy, I have observed the ovaries of 93 cases, who all had the regular course of menstrual periodicity, as to whether they had already ovulated or not, and as to which period they were in with respect to the next coming menses, and obtained the following results as shown in Table II.

It will be clear from Table II, that the ovaries between the 1st and the 11th day before the forthcoming menses are all ovulated and have the corpus luteum; the ones between the 12th and the 16th day are intermingled some being already ovulated and others not yet ovulated; and those before the 17th day are all nonovulated. Therefore the ovulation period occupies 5 days between the 12th and the 16th day before the menses, having no connection with the length of menstrual periodicity.

14. My own Observation (3).

As stated in the previous chapter, in the ovaries between the 1st and the 11th day before beginning of the next menses, the corpus luteum is always found. But if it were possible that the ovary just before the onset of menstruation might have the corpus luteum in the proliferation phase, then the above mentioned conclusion would be unreliable, in order to obtain data for my own belief, I have carried out a microscopical examination on ovaries, especially on corpora lutea castrated in 35 cases out of 93, in

Table No. 1

Days after beginning of menses	Not yet ovulated cases	Already ovulated cases
1	1	-
2	2	-
3	-	-
4	2	-
5	2	-
6	5	-
7	4	-
8	3	-
9	5	-
10	4	-
11	1	1
12	4	2
13	2	2
14	1	-
15	5	4
16	3	3
17	1	5
18	2	4
19	1	7
20	1	5
21	-	3
22	3	4
23	-	4
24	-	2
25	-	8
26	1	3
27	-	2
28	-	2
29	-	2
30	-	5
31	-	-
32	-	3
33	-	1
34	-	1
35	1	-
36	-	-
37	-	-
38	-	-
39	-	-
40	-	-
41	3	2

Table No. 2

M. Cycle	Cases	Days before next menses																												M
		30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
45	1																											⊘				
41	1																			⊘												
39	2													○						○												
37	1						○																									
36	1							○																								
35	1																												⊘			
34	2												○																	⊘		
33	3																	○		⊘	⊘											
32	6								○						○	⊘					⊘									⊘		
															○																	
31	1								○																							
30	33							○				○		○			○	⊘		⊘		⊘					⊘	⊘				⊘
									○	○	○	○			○		⊘		⊘		⊘	⊘							⊘		⊘
								○				○		○			○	○		⊘							⊘	⊘				⊘
29	6										○	○								⊘				⊘				⊘			
28	18								○				○		○						⊘		⊘		⊘			⊘		⊘		
										○				○			⊘		○				⊘	⊘		⊘		⊘		⊘		
27	7															⊘			⊘				⊘					⊘		⊘		
26	4																	⊘										⊘		⊘		⊘
25	2																							⊘			⊘					
24	1																										⊘					
23	3																					⊘					⊘	⊘				

○ = Nonovulated case ⊘ = Corpus luteum

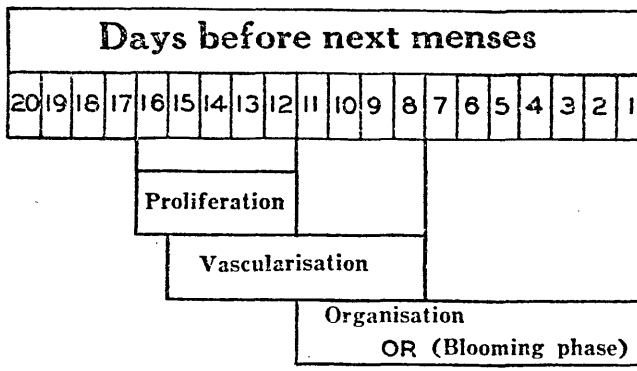
which cases their developmental stage was seen, and obtained the following findings shown in Table III.

In Table III, it is quite clear that the corpora lutea in the proliferation phase are seen between the 16th and the 12th day before the menstrual flux; the ones in the vascularisation phase are seen between the 15th and the 8th day; the others in the blooming phase between the 11th day and the time directly before the menstrual onset, all being found in developmental stages in a certain order and in a certain limited period in regard to the forthcoming menses. From this finding it is a most plausible conclusion that the ovulation period is in the 5 days between the 12th and the 16th day before the onset of the menses.

15. My own Observation (4)

If it be true, that the ovulation period is in the 5 days between the 12th and the 16th day before the onset of the

Table No. 3



menses, the findings hithertofore reported by the various authors should be put in accord with my own observations, if the ovulation period be estimated from the beginning of the forthcoming menses. I have reexamined the 557 cases reported by *Schroeder, Ruge, Reusch, Halban U. Kehrer, Seitz, Wintz, Fraenkel, Tschirdewahn,* etc., and obtained the following result as shown in Table IV.

As shown in Table IV, there is found a discrepancy only in 15 cases out of 557. There are not a few cases among them, in which the menstrual periodicity is not minutely described, it being stated as roughly of the 3 or 4 weeks type. I calculated the 3 weeks type as the 21 days type, and the 4 weeks type as the 28 days one. But if the latter type

does not mean exactly one of 28 days, the discrepant cases will be decreased in number. At any rate, it is a remarkable fact that there are seen only 15 discrepant cases, or 3% among the 557 observed by previous authors; and the fact

Table No. 4

Name of Author	Number of Observed Cases	Discordant Cases
Schroeder	100	0
Ruge II	106	2
Reusch	28	2
Halban Kehrer	40	2
Seitz Wintz	27	0
Fraenkel 1904	7	0
Fraenkel 1910	85	3
Fraenkel 1911	38	2
Tschirdewahn	126	4
Total	557	15

will endorse my own view concerning the ovulation period.

16. Observation on Midmonth pain (5).

The woman who is in a slightly pathological state, suffers from pain in the lower abdomen in just about the mid-period between two menses, it lasting about several hours—and being designated the midmonth pain. It is generally regarded as being the pain of the ovulation period. If so, an examination as to what time in relation to the next menses the midmonth pain will occur may be used for the determinatoin of the ovulation period.

Tschirdewahn reported on midmonth pain in one case, which was observed for one and a half years, showing his

results in Table V, and giving the days between the midmonth pain and the next coming menses and the days of each menstrual periodicity.

It is clear from the above, that if reckoned by the number of days after the onset of the last menses, the midmonth pain is found between the 14th and the 22nd day, but if reckoned by the number of days before the onset of the next coming menses, it is found between the 12th and the 15th day, except in one case only, in which it is seen on the 10th day before the next menses, the case being of the 24 days menstrual cycle type. The ovulation period is seen therefore in the 5 days between the 12th and the 16th day before onset of the forthcoming menses, even in the slightly pathological state as in the case of midmonth pain.

I will refer to the midmonth pain case reported by *Ando* in Table VI.

In this case, the midmonth pain is found between the 13th and the 19th day after the beginning of the last menses, and between the 14th and the 16th day before the next coming one, the latter term covering the so-called ovulation period, which is in the 5 days between the 12th and 16th day before the next menses.

My own Observed Midmonth pain case.

Patient S. M. 41 years old, gave birth 7 times and is quite healthy. Since 1926, at the age of 34, when she gave birth to her 7th child, she has been practicing birth control under my conception period theory for a period of 7 years with successful results. It is interesting that she should have typical midmonth pain. According to her description, the vaginal secretion or white flow is increased slightly with the approach of the midmonth pain period. At this period she feels a slight tightening and drawing feeling in the lower abdomen, the latter one being so slight that she is merely aware of it, and does not feel pain from it, if she is sitting, but feels a radiating pain extending to both thighs if she is walking, lasting for about half a day. She regards the midmonth pain period as the ovulation day, and the vanishing of the pain as the completion of the ovulation. Thus she is able to know her own ovulation period, and she is practising birth control with successful results by applying the following facts; namely, that the length of life of spermatozoa is 3 days, and that the period from the next evening after the ovulation is the sterility stage according to my theory. Though her menstrual periodicity is of the type lasting from 24 to 31 days, yet she has been able to recog-

Table No. 5

(Tschirdewahn)

Beginning of menses	Date of midmonth pain	Days of midmonth pain calculated after beginning of menses	Days of midmonth pain calculated before next menses	Cycle of menses
23.V.1917	6.VI.1917	15	12	26
18.VI.	2.VII.	15	14	28
16.VII.	6.VIII.	22	15	36
21.VIII.	6.IX.	17	12	28
18.IX.	4.X.	17	13	29
17.X.	31.X.	15	13	27
13.XI.	27.XI.	15	15	29
12.XII.	27.XII.	16	15	30
11.I.1918.	26.I.1918	16	14	29
9.II.	24.II	16	14	29
10.III	25.III	16	14	29
8.IV.	?	–	–	–
5.V.	20.V.	16	14	29
3.VI.	20.VI.	18	14	31
4.VII.	18.VII.	15	15	29
2.VIII.	15.VIII.	14	14	27
29.VIII.	12.IX.	15	10	24
22.IX.	9.X.	18	13	30
20.X.	5.XI.	16	12	27
17.XI.	31.XI.	15	—	—

nize her ovulation period for a period of 7 years, realizing my own theory in practice.

For the study of the ovulation period, an exact method is to refer to the histological findings on the corpus luteum and endometrium, but there is a weak point here, in that it is difficult to know whether the forthcoming menses may come at the supposed time or not. In applying the midmonth pain, there is also a weak point, in that this phenomena is of a slightly pathological nature, but it is possible to know exactly when the midmonth pain occurs before the forthcoming menses. This fact concerning the midmonth pain shows that my opinion regarding the ovulation period is well grounded.

17. My own Observation (6).

If it is a fact that the ovulation period is the 5 days between the 12th and the 16th day before the next menses begins, it may be expressed in other words, namely, that the next menstrual flux will take place between the 13th and 17th day from the ovulation day, if conception does not occur. If that be so, then when both ovaries observed on the occasion of laparatomy have only follicles, and the corpus luteum is not developed, the next coming menses should

Table No. 6

(Ando)

Midmonth pain	Menses	Days of midmonth pain calculated before next menses	Days of midmonth pain calculated after beginning of menses	Cycle of menses
11. IX.	26. IX.	15	–	–
12. X.	27. X.	15	17	31
14. XI.	30. XI.	15	19	34
15. XII.	30. XII.	15	16	30
13. I.	28. I.	15	15	29
13. II.	1. III.	16	17	32
13. III.	29 III.	16	13	28
14. IV.	28. IV.	14	17	30

come on the 13th day or thereafter, and when the corpus luteum is already in the developmental stage, the next menses should come before the 17th day after the operation.

There are not so many cases in which we are able to examine the above stated conditions, though there are for example, the case of tubal sterilization by the laparatomic but not vaginal operation; the case of salpingostomy; the case of uterine replacement by the abrasion of adhesion; and some other special cases. For the past 5 or 6 years, I have carefully examined the ovaries, especially regarding the ovulation or nonovulation, on only 19 cases by such operations, and calculated when the next menstrual flux may come thereafter. As these findings may furnish an important experimental ground for the solution of the problem of the ovulation period, they are shown in Table VII.

In Table VII, the ovaries already ovulated and nonovulated at the time of the operation are shown in relation to the time when the next menses came; and it can be clearly seen that the menses came always more than 12 days later if the ovaries were not yet ovulated at the time of the operation, and it came before 17 days if they were already ovulated.

In the same table, in the case which did not yet show ovulation on the 18th day before the next menses, the ovaries were regarded as in the 22nd day from the beginning of the last menses, and it will be shown that the menstrual periodicity was of the 39 days type.

According to the views of authors writing hitherto, if the case does not show ovulation on the 22nd day after the beginning of the last menses, it is considered that the case does not ovulate on the 7th day before the next menses, regarding it as of the 28 days type. However, as shown in my case, there is no doubt that this is not of the 28 days type, but that it shows in fact a longer periodicity.

As stated above, my theory concerning the ovulation period is supported by these findings obtained by the special operation. But in this method, the following points should be carefully observed in order to avoid errors; namely, that one might microscopically overlook the small corpus luteum before the menses; that one might mistake the small cystic corpus luteum for the nonovulated cystic follicle; and also that one should take the nonovulating cycle in pathological cases into consideration.

It seems to me that *Hartman* has a view that in the monkey the length of the period from the beginning of the

Table No. 7

	Number of days before the subsequent menses																									
	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	M
Finding at the operation time		○			○			○							◍						◍				◍	
◍ = Corpus luteum									○	○	◍		○	○		◍		◍				◍			◍	
○ = Follicle								○							◍						◍					
Menstruation cycle																									26	
		36			29			?							33						24				65	
									32	26	?		28	33		30		28				28			28	
								39							32						21					
Days after beginning of menses																									26	
		13			9			?							23						20				65	
									16	11	?		16	22		21		21				23			28	
								22							22						17					

last menses to ovulation is more regular than that from the ovulation to the next menses. But in the human being the length of the latter period is regular, as shown in Table VII and in the midmonth pain cases.

According to *Knaus's* report in 1933, the ovulation period is to be limited only on the 14th day before the next menses. This is also an error, because the period should be in the 5 days between the 12th and 16th day before the next menses, as seen also in Table VII and in the midmonth pain cases.

18. Psychological Influence on the Menses. Any influence of the great earthquake catastrophe on the menses?

According to the descriptions of *Drs. Fraenkel, Franz, Zondek, Nürnberger, Schroeder, Schaeffer, Meyer, Warthard,* etc., psychological stimulus has a certain influence on the menses. If the psychological stimulus acts in a chronic way, there is not so much influence on the problem of ovulation; on the contrary, if it acts acutely, there is a certain phenomenon to be seen regarding the menses course. For example, the menstrual flux may be suddenly provoked by anger, terror, worry and sorrow; or the expected flux or one in progress may be stopped. If that be so, the length of the period between ovulation and the next menses will be consequently irregularized. Though the fact stated above has not been confirmed on a scientific basis *(Franz, Zondek),* it is traditionally believed in general. I have no intention of denying this phenomenon, but I could not find statistically any influence on the menses of women who suffered from shock as a result of the last great earthquake catastrophe, as shown in the following.

September 1st, 11h, 58′ A. M. 1923, a terrible earthquake, tidal wave and fire occurred in Tokyo and Yokohama, practically reducing these cities to ashes and several hundred thousand inhabitants were injured or killed. At that time the American people gave us several million dollars as a token of their hearty sympathy with the effort for the reconstruction of our capital city. As symbols of their sympathy, a grand building in the Tokyo Imperial University has been built as a University Library which is perfection itself; and a great, well-equipped hospital has been founded as a model of its kind, both representing the gratitude of our nation.

Such a catastrophe obviously brought terror to the

women who suffered from it. In order to examine how such terror acts on the menses, I investigated in November of that year concerning the menstruation of the pupils of two girls' schools, especially on the beginning time and on the duration of the menses in the period between August and November, studying 485 cases, among which were 253 pupils lodged in the stricken area, while the other 232 were lodged outside of the stricken area because of the summer vacation.

Of the 253 pupils who went through the catastrophe, the beginning times of menstruation are recorded in Table VIII.

The onset of the menses is recorded by calendar date. There is found no disturbance with regard to the beginning of the menses of the women who suffered from the catastrophe, the figures being the same as those for the ones who did not suffer it.

Thirty-two among the 253 women who suffered the calamity had menstruation in progress on the 1st of September; 10 among the 32 had its beginning on the 1st of August, and the others had its onset at the end of that month. The duration of their menses was the same as before and thereafter, there being no shortening or no prolongation, and no sudden stoppage of bleeding as a result of the experience. In short, there was no discernible influence.

19. **Psychological Influence on Menstruation.**
The anxiety occasioned by laparatomy does not cause any change in the length of time between ovulation and the subsequent menses.

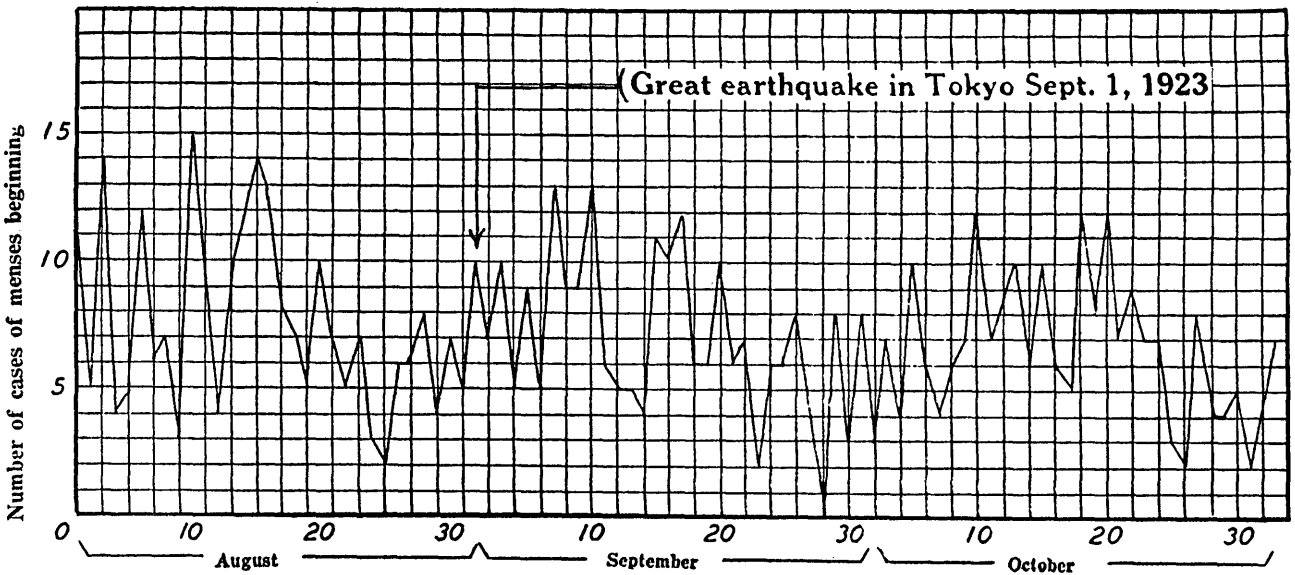
Generally speaking, the woman who is subjected to the laparatomy operation may have an uneasy feeling before it, which does not however cause any disturbance in the ovulation period, as shown above with the cases of laparatomy and midmonth pain.

20. **Ovulation provoked by the stimulus of sexual union.**

In the 18th century, it was generally believed, that ovulation would be provoked at any time by the sexual act, and that the menstruation would have no relationship to the ovulation. Even in the 19th century, *Hensen* (1881) believed that ovulation would be hastened by sexual intercourse.

In this century, *Chasan* (1911) divided ovulation into two groups, spontaneous ovulation and violent ovulation, the latter one being that brought on by the violent action at the time of the sexual act. According to the present

Table No. 8


Great earthquake in Tokyo Sept. 1, 1923
Number of cases of menses beginning
15
10
5
0
10
20
30
10
20
30
10
20
30
August
September
October

author's view, ovulation should be accompanied by follicle ripening, which signifies that the ovum should be in the process of maturation and division. In mammals, it is generally believed that ovulation occurs in the second ripening and dividing stage of the ovum, as in the so-called metaphase. In the human being, ovulation seems to occur at the same stage as shown by *Allen, Bland, Platt, Newell,* etc. Accordingly, even if the follicle should be burst by violent action at any time, this cannot be regarded as the real ovulation, and the discharged ovum is immature, having no capacity to fertilize. In animals, a similar phenomenon to the above stated violent ovulation is not discernible. Consequently the violent ovulation cannot be recognized.

In the period after the European war, *Zangemeister* (1917), *R. Meyer* (1920), *Fraenkel* (1924), *Trippel* (1929), *Thomson* (1921), *Mollendörf* (1922) seem to have considered that the ripening of the follicle and ovulation will be hastened, resulting in provoked ovulation, by the sexual act. The provoked ovulation theory was convenient to explain the discrepant results concerning the ovulation period published by the authors writing hitherto, and also was necessary to the theory that the woman can conceive at any time, according to the statistical findings.

Groesser, Wittenbeck and *Bolaffio* insisted recently on the provoked ovulation theory, to accord with *Groesser's* idea that in mammals in general, conception and fertilization should occur at the same time, and that if human ovulation is seen on about the 15th day, and the highest optimal period for conception occurs on about the 7th day after the beginning of the menses, then provoked ovulation should be recognized in the human being besides natural ovulation. Furthermore similar phenomena are to be seen in rabbits and cats.

I reject the provoked ovulation theory for the following reasons.

(a) It is a clearly contradictory fact to the provoked ovulation theory that ovulation should occur in the five days from the twelfth to the sixteenth days before the succeeding menses in the findings on several hundred married women, who have had sexual union as occasion demands.

(b) There is a certain discrepancy in the views of the author's writing hitherto, concerning the ovulation period, and consequently the provoked ovulation theory would be postulated in explanation of this lack of accord. But following my theory, the discrepant findings on the ovulation

period will be nullified without any need to utilize the phenomenon of provoked ovulation.

(c) The basis of provoked ovulation theory put forward by *Groesser* is demonstrated to be unfounded and untrue, because it is now clear that the optimal conception period is not directly after the menses as shown in Chapter IV.

(d) The theory of provoked ovulation has been believed in from ancient times until the present day, but there is no proof of its accuracy.

21. Ovulation and menses in the pathological state.

In a certain pathological state, there is an exceptional phenomenon to be seen in the ovulation period occurring in the 5 days from the twelfth to the sixteenth day before the subsequent menses. For example, the menstrual flux might occur before the 13th day after the ovulation, when acute pustulous inflammation or some other severe disease might eventuate in the ovary after the ovulation. There would be no menstruation, for the uterus has no reaction to the corpus luteum hormon when it has a serious disease or is hypodeveloped.

In the case of follicle persistency or policystic degeneration, there may be sometimes seen in the human being abnormal menstrual bleeding without ovulation similar to the nonovulatory cycle occurring in the monkey as a physiological phenomenon.

In the above mentioned pathological state, conception does not occur, and accordingly it has no relationship to the problem of the conception period.

22. Summary of this chapter.

As ovulation has a causative relationship to the succeeding menses, therefore, the date of ovulation should be estimated from the subsequent menstruation, not from the last one.

In the reports of earlier authors concerning the ovulation period, there is a certain discrepancy, and it has seemed that ovulation would be likely to occur at any time. The cause of such a discrepancy in the results lies in two unreasonable points, namely, that the authors did not pay much attention to the menstrual periodicity, and that they showed the period of ovulation conventionally in terms of the number of days after the last menses.

According to my investigation, the date of ovulation in the physiological state is in the 5 days from the twelfth

to the sixteenth day before the next menses, being unrelated to the length of the menses cycle: that is to say, the succeeding menses will begin from the thirteenth to the seventeenth day after ovulation.

It is generally believed that psychological stimulus will have a certain influence on the menses. According to my researches on the women who suffered from the recent great earthquake and fire catastrophe in Tokyo and Yokohama, there was no influence shown on the menses by such a terrifying experience. The uneasy feeling at the time of a laparatomy operation has no influence on the menses. I cannot recognize the theory of a provoked ovulation which would be caused by the stimulus of the sexual act.

23. Conclusion.

The period of ovulation in the physiological state is in the 5 days from the twelfth to the sixteenth day before the subsequent menstruation, having no connection with the length of the menses periodicity; consequently therefore, the next coming menses will occur from the thirteenth to the seventeenth day after ovulation, if conception does not take place.

CHAPTER III
DURATION OF THE FERTILIZABLE CAPACITY OF THE OVUM

1. Introductory Remarks.

In the previous chapter, it has been made clear that the date of human ovulation is in the 5 days from the twelfth to the sixteenth day before the subsequent menstruation, so that the menstruation will occur from the thirteenth to the seventeenth day after ovulation. If so, it becomes important to investigate the conception period, that is, to determine how long the ovum is fertilizable.

In the present chapter, the following points concerning this problem will be stated, namely, the maturing procedure of the ovum in mammals; the developmental stage of the ovulated ovum; the fertilizable stage of the maturing ovum; and the length of time of the fertilizable ability of the ovum retained in animals, especially in mammals, all of which points have been well investigated by various authors. Previous authors' views on the relation of these problems in the human being and the change of views will be briefly stated, together with my own clinical observations and those of others. It will also be made clear that the duration of

the fertilizable capacity of the human ovum is short as in the case of mammals.

2. Findings on animals observed by various investigators.

According to the investigations of many authors, the ovum is not capable of fertilization if it does not carry on the maturing division in a certain order, this being carried out continuously in two periods, the orders being as follows, namely, prophase, metaphase, anaphase, and telophase. One of the two continuous divisions is called the diminishing or reducing division, by which the chromosomes are diminished in number by one-half. Such an ovum which has passed through the reducing division is fertilizable with a spermatozoa which has also already passed through its own reducing division. By such a union, the fertilized ovum can obtain a certain number of chromosomes characteristic of its own animal species.

The relation of the maturing division of the ovum to ovulation.

According to *Groesser's* description, the first maturing division occurs before the ovulation, and ovulation itself happens after the beginning of the second maturing division in all mammals except dogs, in which the maturing division occurs in the tubal canal directly after the ovulation.

Watanabe obtained the same findings as that of Groesser, when working on the white rat, in which the ovulation occurs in the middle period of the second maturing division (metaphase).

In what stage of the maturing division of the ovum does fertilization or the union of the ovum and spermatozoon occur? Groesser's findings show that it happens always in all kinds of mammals, in the course of the second maturing division this being the same as the results obtained by *Watanabe* on the white rat. In from 24 to 48 hours after ovulation, *Hartman* found the fertilized ovum in the two, three, and four cells stage respectively in a case when he studied monkeys. These findings show that fertilization will happen directly after ovulation.

The fate of the nonfertilized ovum after ovulation. Regarding this, *Sobatta, Lams, Corner, Lewis, Watanabe,* etc., have observed the following phenomenon, namely, that the non-fertilized ovum stopped its division in the second stage and degenerated or died out after several parthenogenetic divisions.

How long does the ovum remain fertilizable? As stated

above, the maturing division of the ovum occurs in two periods continuously without stopping, and fertilization can occur in the middle period of the second division, but not thereafter. Consequently *Groesser* considers that the fertilizing period of the ovum is within a few hours after ovulation. *Hammond* investigated with rabbits, in which the fertilizing period is until three hours after ovulation, and *Watanabe* observed in the case of white rats that the ovum showed miscroscopically a degenerating change 12 hours after ovulation.

From these findings, we may say that the duration of the fertilizable capacity of the ovum is from a few to twelve hours after ovulation, even if the previous authors' findings are slightly discrepant, it being of a few hours duration but not lasting a day.

3. Previous authors' views concerning the period of the duration of the fertilizable ability of the human ovum.

In regard to the relationship between the ovum and the follicle or the corpus luteum, *R. Meyer* (1913) expressed the following view, namely, that the follicle will fall into degeneration if the ovum dies, because the ovum governs the maturing process of the follicle, and that by the far-reaching action of the matured ovum, the corpus luteum is also controlled, being early degenerated if the ovulated ovum dies early, and on the contrary, continuing alive if the ovum lives, following the fate of the latter. *R. Shroeder* had also at that time the same idea. According to this view, it should be considered that the ovum might continue living from the ovulation to the beginning of the subsequent menstruation.

Siegel in 1917 considered that the length of life of the ovum is three weeks or more, and that there are more children of the female gender if conception occurs before the subsequent menstruation, and there are more of the male gender if the pregnancy occurs after the next coming menses.

Van de Velde said that the ovum may remain alive for 15 days.

The long life theory of the ovum stated above is gradually coming to be regarded as unfounded by recent authors, and there are therefore now few men who still believe in such a theory.

4. Observations of *Allen, Bland, Platt* and *Newell.*

Allen and his co-workers found an ovum in the course

of the second maturing division in a 10 m.m. large follicle on the 14th day after the beginning of menstruation, and a degenerated, nonfertilized ovum in the tubal canal in the same period in 5 cases. From this finding, we may say that the human ovum will be ovulated in the course of the second maturing division period, and that fertilization will take place directly after ovulation as in other mammals.

5. No primacy of the ovum over the follicle and lutein body.

As stated in the previous chapter, the ripening of the follicle and the formation of the corpus luteum are realized under the action of the anterior lobe hormon of the pituitary gland, as shown by *Smith-Engle* and *Zondek-Aschheim*. This fact shows that the ovum has no primate action over the follicle and the lutein body, as was made clear by *Zondek's* experiment.

Knaus found that the corpus luteum of the rabbit retained its function for 16 days, despite the death of the ovum, which soon died in the case of false pregnancy.

Hartman proved experimentally that the subsequent menstruation flux came generally according to its estimated course in the monkey, even if the fertilized ovum were taken out within one or two days after the ovulation. It will be shown that the taking out of the fertilized ovum has no accelerating action on the menses.

Accordingly it will be clear that the ovum has no primate influence on the follicle and on the corpus luteum, and it may be also denied that the human ovum could have a long life.

6. My own observation.

In the previous chapter, it is stated that the ovulation period is in the 5 days from the twelfth to the sixteenth day before the subsequent menses. To know statistically whether pregnancy will be brought about by sexual union at a date after the ovulation period, the above datum is utilized in order to show the duration of the fertilizable ability of the ovum.

(a) I investigated minutely the menses cycles and its activating scopes in 22 cases with known pregnant dates, and also studied the relation between ovulation and the conception period, finding that no pregnancy occurred as a result of the sexual act on the days after ovulation.

(b) In the examination of 88 pregnant cases occurring

within 3 months after marriage, I found that 11 out of 49 women, who were married at the ovulation period or before it, had pregnancy without menstruation after the marriage, and that 39 women, who were married after the ovulation period, all had menstruation once or more before conception, showing that the ovum had by that time no fertilizing ability.

(c) Thirty-nine pregnant women who had conception without menses after marriage, had been married at the ovulation period or before it. In the women married after the ovulation period I have had no case of a woman who had pregnancy without menses after marriage.

(d) I have interesting statistics to the effect that six healthy women capable of conception had sexual union 300 times over an aggregate number of 142 months, the union being in every case carried out in the eleven days before the subsequent menses, namely, after the ovulation period, all without pregnancy. To detail minutely, the number of sexual unions and their period:—they were carried out in 36 cases on the 1st day before the subsequent menses; in 30 cases on the 3rd; in 30 cases on the 4th; in 34 cases on the 5th; in 26 cases on the 8th; in 20 cases on the 9th; in 8 cases on the 10th; and in 23 cases on the 11th day.

In Table 9, the record of one of these cases is shown.

Summarizing the findings on 22 cases with a known conception date, on the 39 cases made pregnant without menses after the marriage and on the 300 cases of sexual union on the days after ovulation without pregnancy during 142 menstrual cycles, it will be clear that the human ovum has not such a long life, and that its fertilizable ability lasts for a very short time, its capacity vanishing from the next evening after the ovulation.

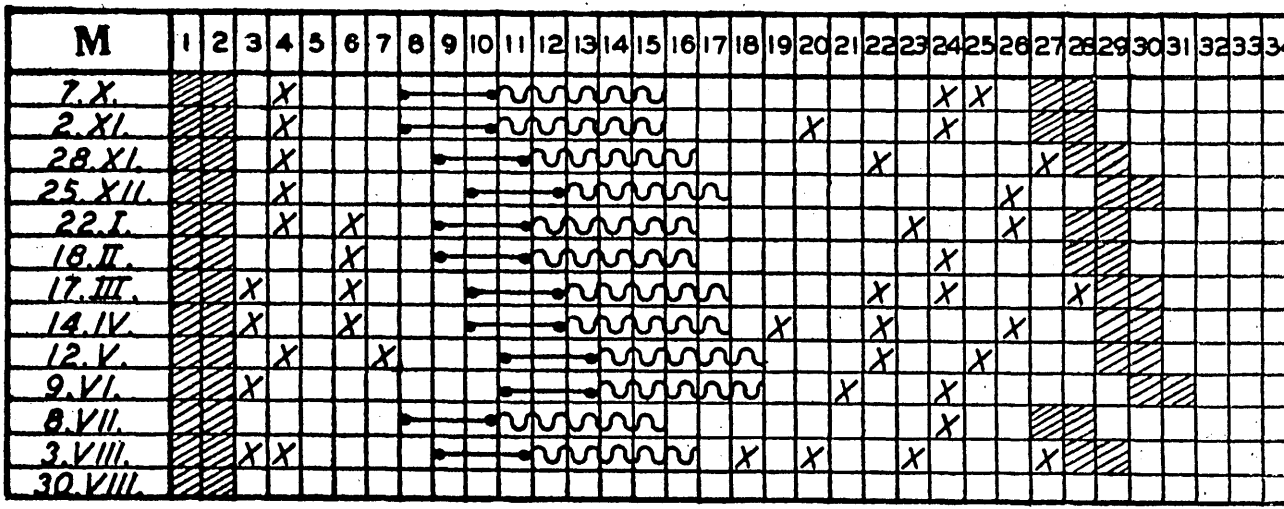
7. Clinical observations of other authors.

The 9 pregnant cases with a known pregnant period reported by *A. G. Miller* (1933), and the cases reported by *Knaus* (1933), all had conception as a result of the sexual act in the ovulation period or 2-3 days before it, but not during the 11 days before the subsequent menstruation.

Miller stated that 89 women had sexual union 371 times during the 11 days before the menses without pregnancy, and he observed one case over a period of one year with the same result. *See Dr. Miller's article at end of Book.*

In many of *Knaus's* observations made hitherto, there

Table No. 9



▨ = Menses X = Cohabitation ∿∿∿ = Ovulation time

——— 3 days before Ovulation time

has been no record concerning the menstrual periodicity and date of sexual union, even though he had observed very interesting cases one after the other. However, he reported recently (1933) on 2 cases with an exact record at the date of the sexual act and of the beginning of the menses.

In Table X the cases reported by *Miller, Knaus* and by me are shown as regards the observations on conception during the 11 days before the succeeding menses.

As shown in Table 10, 96 women had sexual union 754 times during 424 months in the period of the 11 days before the subsequent menses, but all without pregnancy.

8. Summary of this chapter.

It is an established view held among the investigators, that the ovulation and fertilization of the mammalian ovum occur in the period of the second maturing division, and that the fertilizable ability lasts only from three to twelve hours after ovulation.

In the human being, the ovum in the second maturing division was seen by some authors in the period before ovulation, and the degenerated ovum was also observed within a few days after ovulation. Accordingly, if one observes the biological phenomenon carried on inside the ovum, it must be evident that the human ovum should be regarded as fertilizable only in the period directly after ovulation.

In former days, many authors considered that the human ovum would have fertilizable ability for a long time after ovulation, but this view has been denied as unfounded, from the experimental findings.

From the clinical standpoint, it was impossible to estimate how long the ovulated human ovum remained fertilizable, because the problem of the ovulation period was unsolved. But on the contrary, the ovulation period is perfectly known at the present time. By my own observations, and by the clinical findings of many other recent authors, it is clearly proved that the human ovulated ovum also retains its fertilizable ability for a short duration like that of other mammals.

9. Conclusion.

The human ovulated ovum also retains its fertilizable capacity for a short time like that of other mammals. Though it is not yet known how long the ability lasts within a period of from three to twelve hours, it is certain at any rate that the ovum loses its ability from the next evening after the

Table No. 10

Author	Cases	Month	Days before next menses										
			11	10	9	8	7	6	5	4	3	2	1
Knaus	2	24	4	4	11	1	3	3	7	6	7	3	4
Miller	1	12	1	3	2	5	2	3	5	3	3	3	0
	87	246	14	2	14	8	19	41	45	41	44	61	82
Ogino	6	142	23	8	24	26	31	26	34	30	32	30	36
Total	96	424	42	17	51	40	55	73	91	80	86	97	122

ovulation; consequently the woman enters into the sterility phase from the succeeding evening after ovulation.

CHAPTER IV

DURATION OF THE CAPACITY FOR FERTILIZATION OF THE SPERMATOZOA DISCHARGED IN THE FEMALE GONADS

1. Preface.

As mentioned above, the human ovum retains its fertilizable ability for only a short time and the woman is sterile from the subsequent evening after ovulation.

If so, then it is an important point in the determination of the conception period, to find how many days the woman is fertilizable before ovulation, or from what time before the ovulation the sexual act is effective. This problem will be clarified by the examination of the duration of the fertilizing ability of the spermatozoa discharged in the female gonads.

2. Mating-time of mammals.

All mammals have a mating-time which lasts for various lengths of time according to the species, namely, 4-6 hours in white rats, 1-2 hours in mice, 1-2 days in cows, 3 days in pigs, 6 days in cats, 3-10 days in horses, 3 weeks in dogs. Though in cats the mating time duration is 6 days, yet ovulation is said to occur 2 days after copulation, and though in rabbits the mating time is irregular, yet ovulation will occur 10 hours after the pairing. According to *Knaus*, in cows the pairing time duration is for 41 hours, and the ovulation takes place 24-40 hours after the beginning of the mating time. Copulation 10 hours after its beginning is said to be most effective for conception.

From these findings, it seems to me that in most mammals the mating-time at least lasts for 2 days, and even if in certain species of animals lasts a little longer, ovulation will take place within 2 days after copulation. As the ovum should be fertilized directly after ovulation, therefore fertilization should take place within 2 days after the mating. Consequently, it will be seen that in mammals in a natural environment, the fertilizing ability of the spermatozoa lasts for 2 days. Though the above mentioned conclusion may have been obtained from the fact that mammals with the exception of monkeys can copulate only in the mating time, it is still necessary to determine whether the spermatozoa might have a much longer fertilizing ability or not.

3. Experimental findings on mammals.

Concerning the life length of spermatozoa in the female gonads, *Sobotta* found spermatozoa dying in the uterine cavity of mice and white rats 9-10 hours after copulation. *Yochem* found them in rats after 12-16 hours, in guinea-pigs after 41 hours. *Lewis* found them in pigs after 41 hours and *Anderson* found them in horses after 41 hours. *Hoehne Behne* found experimentally that though spermatozoa have usually disappeared from the uterus of rabbits 20 hours after copulation, they are rarely found 2 days after it. According to *Bischoff*, the spermatozoa of dogs remain alive in the uterine cavity for 6-8 days after copulation. In bats as the exception among mammals, the pairing is carried out in the autumn and the spermatozoa living over the winter can fertilize the ovum which is ovulated in the next spring. Therefore the spermatozoa of bats retain their fertilizing ability for a length of some months.

In the artificial conception experiment on rabbits, *Hammond* found that conception occurred within 36 hours before ovulation, but could not be brought on before this period.

Hartman found in monkeys that their conception period is from 9 to 18 days after menstruation, and this period is coincident with their ovulation date. The monkey has his mating time, but he is able to pair outside the period of heat. As statistics show that the optimal conception period is coincident with the ovulation time, it seems to me that the spermatozoa of monkeys are also of short duration with respect to fertilizing ability.

4. Life length and duration of the fertilizing ability of mammalian spermatozoa.

From the experimental findings, it is clear that the length of life and the duration of the fertilizing ability of spermatozoa are not the same.

According to *Hammond* and *Asdell*, the spermatozoa of rabbits in the epididymis, where storage of the spermatozoa occurs, live for 60 days, and their fertilizing ability is 100 per cent within a 20 days period, and diminishes gradually, being 30 per cent after 30 days and 20 per cent after 40 days, disappearing thereafter.

If the spermatozoa of rabbits are kept at body temperature, their length of life and fertilizing ability are shortened. According to *Knaus's* experimental findings obtained from chryptoorchism on rabbits, keeping the testicles in the abdominal cavity, the length of life was reduced to 12 days, and the duration of fertilizing ability to 4 days. From the

fact mentioned above, it will be clear that the length of life and duration of fertilizing ability of spermatozoa are different, even as stored in the epididymis.

The spermatozoa have active motility in the vessels of the testicles, but it ceases in the epididymis. They are reactivated when they are ejaculated, being intermingled with the prostate secretion, but the reactivated spermatozoa soon lose their fertilizing ability. According to *Hammond Walton's* finding, the rabbit's spermatozoa obtained from the epididymis are capable of fertilization for 7 days if they are kept in the test-tube at 10 to 15 degrees (Centigrade) but the ejaculated ones are capable of fertilization only for 4 days under the same conditions. If the spermatozoa are kept in the test-tube at 37 degrees (Centigrade), their length of life is not more than 13 to 14 hours.

5. Length of life of the human spermatozoa in the female gonads.

Varying with the parts of the female gonads, namely, whether in the vagina, uterine cavity, tubal canal or abdominal cavity, etc., the length of life of spermatozoa is different.

(a) Length of life of spermatozoa in the vagina.

According to *Ruge's* researches, spermatozoa could be seen within 36 hours after the sexual act in the vagina in 23 cases among 28, and on the 4th day in one case. But this finding is dependent on the dead spermatozoa, not on living ones. Even the dead spermatozoa have disappeared from the vagina within 36 hours, and therefore the living ones must have died much earlier than this.

Hausmann found that the spermatozoa in the vagina had lost their motility after 12 hours at the latest in the non-menstrual period.

Hoehne Behne (1914) observed that the spermatozoa in the strongly acid vaginal secretion of the pregnant woman lost their motility actually within one hour, and that the ones in the weakly acid secretion of the nonpregnant woman were living in large number after the same time, but were all dead 4 hours after the sexual union, and that some remained alive longer than 4 hours when the vaginal secretion was neutral or weak basic in the menstrual period.

Accordingly, the length of life of the spermatozoa in the vagina is dependent on the reaction of the vaginal secretion, it being usually 2-3 hours, and 12 hours at the longest in the non-menstrual period.

(b) Length of life of the spermatozoa in the uterine cavity.

Sims found living spermatozoa in the cervical canal of the uterus 45 minutes after sexual intercourse and *Schwarski* also found living ones in the uterine cavity 30 minutes thereafter.

Hoehne Behne obtained living spermatozoa from the uterine cavity up to 4 days afterwards when he injected them into the rabbit's uterus.

According to *Ruge,* spermatozoa are found in the uterine cavity until 36 hours after the marital act, but are not found 3 days after it. If this be so, it shows that even the dead ones have disappeared within 3 days.

Hausmann found that there are actively motile spermatozoa remaining until 12 hours after coitus; though not actively but motile ones until 3 days afterwards; a very few living ones until 4-7 days afterwards; and none after 8 days.

From those findings, we may say that the spermatozoa remain alive in the uterine cavity up to 3 days after the sexual union, rarely up to 4-7 days; and not after 8 days.

(c) Length of life of the spermatozoa in the tubal canal.

Zweifel found living spermatozoa 15 hours after the sexual act in the tubal canal of a woman who was autopsied.

Dührssen reported that he found many actively motile spermatozoa in the mucous secretion of chronic tubal catarrh 3 weeks and a half after cohabitation, but looked for them in vain thereafter in many investigated cases.

Hoehne Behne could not find any spermatozoa living longer than one day, when he injected human sperma into the tubal canal directly after its extirpation and kept it in the incubator. Accordingly, he opposed the theory that the spermatozoa might live for a long time, for a few days or for five weeks in the tubal canal, and indeed if that be so, there should have been found many living spermatozoa in the tube all the time, because they were coming there every few days, but in reality the reverse was the case.

Nürnberger (1920) found spermatozoa in the tubal canal in 4 cases after his enthusiastic researches, being dead ones in two cases, and living ones in the others. In one case of the latter two, he found two spermatozoa only 13 days after coitus, the one already without motility and the other showing locomotive movement. In the other case, he found also two actively motile spermatozoa 14-15 days after the sexual act. He studied the life length of the sper-

matozoa in the tubal canal by injection of sperm into the tubal canal directly after extirpation, keeping it in the incubator, and he did not find them living more than one day. However he concluded from his findings that the human spermatozoa are able to live in the tubal canal much longer than previous authors had believed.

Though *Fraenkel* reported that he could find living spermatozoa in the tubal canal 2 weeks after cohabitation, nevertheless he said in 1932 that he could not guarantee this patient's story.

(d) Length of life of spermatozoa in the abdominal cavity.

According to *Hoehne Behne's* research the spermatozoa coming into the abdominal cavity will be phagocytized by leucocytes within 4 hours.

If we summarize the above mentioned findings, we see that the length of life of the spermatozoa is up to 3 days, and rarely up to 4-8 days, since *Hoehne Behne, Groesser* and *Engelmann* have the same view.

Nürnberger and *Fraenkel* would seem to have intended to apply their exceptional findings to the determination of the length of life of spermatozoa, but their views would be influenced by the clinical fact stated in the following chapter.

Knaus has doubts about the patients' stories, especially as regards the date of the coitus in the case reported by *Dührssen, Nürnberger, Fraenkel,* etc., in which living spermatozoa were found in the tubal canal 2-3 weeks after the sexual union. Even if that be so, we cannot consider that the spermatozoa can retain their fertilizing ability for such a long period. In mammals it is a definite finding that the spermatozoa retain their fertilizing ability for only two days, and in the human being it may be the same *(Knaus)*.

6. Length of life of the spermatozoa deduced from the statistics on what was hitherto deemed the conception period.

The statistical observations concerning the conception period were reported in the latter half of the 19th century by *Hecker* (1864), *Ahlfeld* (1869), *Haseler* (1876), *Schlichting* (1880), *Zöllner* (1886), *Fürst* (1886), etc., and after the great European War in this century by *Siegel, Jaeger, Prylll* and *Nürnberger*. In all the reports, there is described no sterility phase of the woman, and it is agreed that the optimal phase is on the 7th day or thereabout after the be-

ginning of the menses. This conclusion has been considered generally in medicine as an actual fact.

On the other hand, it is believed by many authors that the ovulation period is on the 15th day or thereabouts after the onset of the menses, as *Schroeder* and others considered.

Contrasting two of these theories, *Pryll* (1917) and *Nürnberger* (1928) deduced that the length of life of the spermatozoa should be at least 7 days or longer, sometimes reaching 2-3 weeks, because the spermatozoa while entered the female gonads at the optimal period for conception should remain alive to the optimal time of ovulation. As the basis to his deduction, *Nürnberger* referred to his own observation on one case in which the spermatozoa were living in the tubal canal 2 weeks after cohabitation. There are not a few investigators, who are in agreement with this deduction *(Fraenkel, Wittenbeck)*.

Groesser (1925), however, pointed out the defect in this deduction. If the optimal date of the ovulation be on the 15th day after the menses begin, and the length of life of the spermatozoa be 1-2 weeks, it could be easily explained that conception would occur as a result of the sexual act 1-2 weeks before ovulation; but it is difficult to explain how the optimal phase for conception is on the 7-8th day before ovulation, or on the 7th day or thereabouts after the beginning of the menses. Opposing the theory of the long life of spermatozoa, *Groesser* insisted on provoked ovulation by the cohabitation stimulus as stated above. But in *Groesser's* provoked ovulation theory, there is also a certain weak point, and it should be rejected as mentioned in the chapter of the ovulation period.

7. My own observation.

As the views of previous authors concerning the ovulation period have been divergent, it has therefore been difficult to determine the length of life, namely, the duration of the fertilizing ability of spermatozoa, from the clinical findings. But as the ovulation date can be determined by my theory, the duration of the fertilizing ability of spermatozoa will be clear after determining just how many days before the ovulation period is cohabitation most effective for pregnancy. From such an observation I have been able to learn that the duration of the fertilizing ability of spermatozoa is 3 days, and to deny the former statistical findings which state that the optimal conception period will be on

the 7th day or thereabouts after the beginning of the menses.

(a) From 1923 until 1933, I had 22 pregnant cases, in which the date of conception was exactly known. By minute inquiries it was made clear that in 21 of the women, their conception occurred as a result of sexual union at the date of ovulation, or within three days before it, and in only one case on the 4th day before it.

If the conception date be placed in the order of days after the beginning of the menses as follows, we find one case on the 8th day after its beginning, 2 on the 9th, 1 on the 10th, 4 on the 11th, 1 on the 12th, 3 on the 13th, 1 on the 16th, 2 on the 17th, 1 on the 18th, 4 on the 19th, 1 on the 22nd, and 1 on the 23rd. As it will be clear from this finding, the conception period is in the intervening period between menstruation, without the 7th day or thereabouts after the beginning of the menses being shown as the optimal conception period.

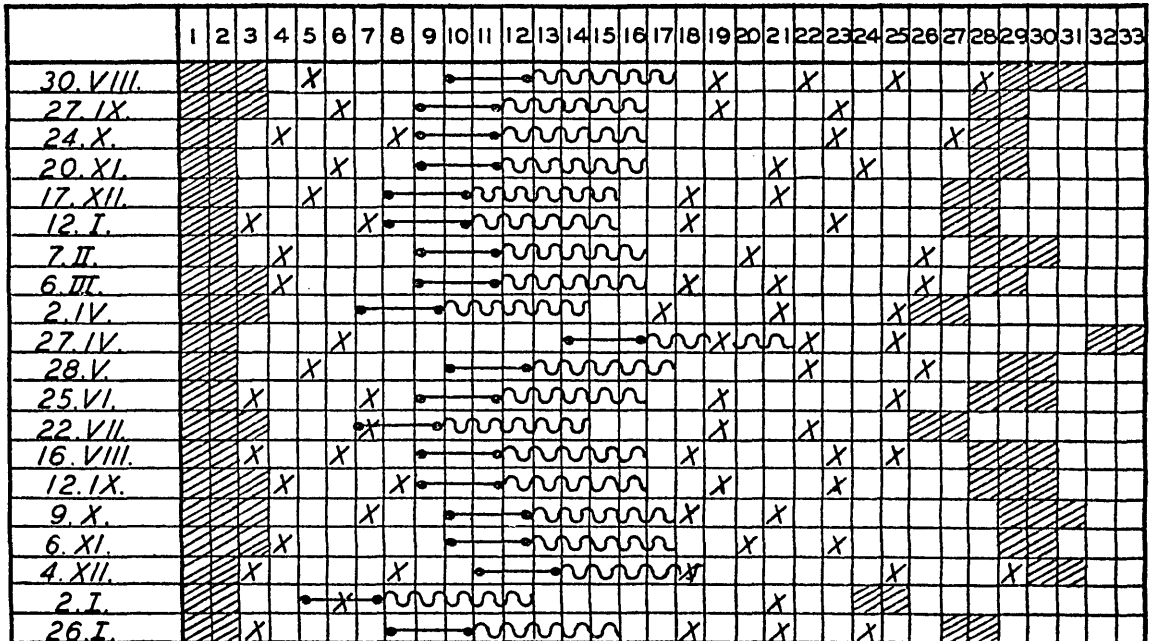
(b) There are sometimes cases of pregnancy which take place without any course of menses after the marriage. If it be true that the post menstrual period is the optimal period for conception, then the marriage of the above mentioned pregnant cases should have taken place in the latter term of the menses.

I have observed 39 cases of pregnancy which occurred without menses after the marriage. If the date of the marriage be placed in order of days after the beginning of the menses, it is as follows: 4 cases on the 1st day afterwards, 1 on the 3rd, 1 on the 4th, 5 on the 5th, 1 on the 6th, 1 on the 7th, 2 on the 9th, 2 on the 10th, 2 on the 11th, 3 on the 12th, 3 on the 13th, 1 on the 14th, 2 on the 15th, 2 on the 16th, 1 on the 17th, 2 on the 18th, 1 on the 19th, 1 on the 21st, 2 on the 22nd, and 1 on the 37th. To summarize, there were 18 cases of marriage taking place up till the 10th day after the beginning of the menses, 17 cases of its being between the 11th and the 20th day, and in the remaining 4 cases it took place thereafter.

If one bears in mind the fact that sexual union after marriage will be carried out at one's free will, my statistical finding is not in accordance with the hitherto expressed view, that the optimal conception period is about the 7th day after onset of the menses, but it shows the middle term of the menstrual cycle as the optimal time for conception.

(c) In the case of 5 healthy, fertilizable women, sexual

Table No. 11


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
30. VIII.
27. IX.
24. X.
20. XI.
17. XII.
12. I.
7. II.
6. III.
2. IV.
27. IV.
28. V.
25. VI.
22. VII.
16. VIII.
12. IX.
9. X.
6. XI.
4. XII.
2. I.
26. I.
= Menses
X = Cohabitation
= Ovulation time
=3 days before Ovulation time

intercourse was carried out 69 times during an aggregate of 111 months in the term from the 4th to the 11th day before ovulation without pregnancy supervening, showing the dates of cohabitation as follows: 3 times on the 4th day before the ovulation, 2 on the 5th, 14 on the 6th, 13 on the 7th, 21 on the 8th, 10 on the 9th, 4 on the 10th and 2 on the 11th. The date of the sexual union was from the 3rd to the 8th day after the beginning of the menses, which is the optimal period for conception according to the hitherto expressed view. Nevertheless the marital action was all in vain as regards the pregnancy, because it was carried out 3 days before ovulation.

In Table 11 the record of one case will be shown.

The finding on this case is in accordance with the view that the duration of the fertilizing ability of spermatozoa comes within 3 days, and is contradictory to the theory that the optimal date for conception is on the 7th day or thereabouts after the beginning of the menses.

8. **Recent clinical observations of various authors.**

Nine pregnancy cases reported by *A. G. Miller,* with a known conception date were all occasioned by sexual union taking place in the ovulation period or 3 days before it.

In *Knaus's* report, I can point out 8 pregnant cases in which the date of conception was known, and in which conception was also occasioned by sexual union at the ovulation period, or within 3 days before it .

In Table 12 the 47 pregnancy cases with a known conception date reported by *Knaus, Miller, Remmelts, Iijima* and myself are placed in order of days after the beginning of the menses in order to show the conception period.

As clearly shown in Table 12, the date of conception is found between the 8th and the 23rd day after the beginning of the menses, mostly on the 15th day or thereabouts, and it accords with the ovulation period, which was shown by *Meyer, Schroeder* and *Fraenkel,* together with the days after the onset of the menses. If so, the conception date accords with the ovulation period, and with the view that the duration of the fertilizing ability of spermatozoa comes within 3 days. On the contrary, it denies the hitherto expressed idea that the optimal conception period would be in the period directly after the menses, namely, on the 7th day or thereabouts after the menses begin.

According to my observations, it is clear that sexual union taking place during the so-called optimal conception

Table No. 12

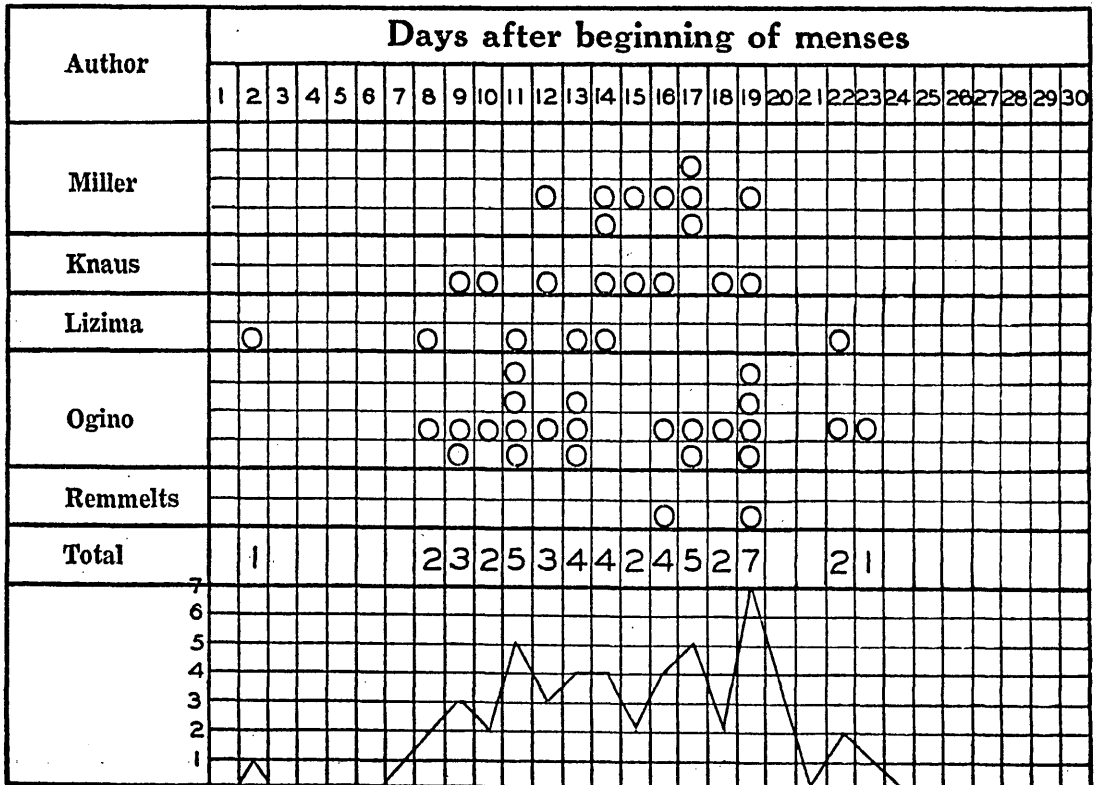

Author
Days after beginning of menses
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Miller
Knaus
Lizima
Ogino
Remmelts
Total
1 2 3 2 5 3 4 4 2 4 5 2 7 2 1
7
6
5
4
3
2
1

Table No. 13

(A. G. Miller)

Cases	Cycle	Months	Days after menstruation										Total
			1	2	3	4	5	6	7	8	9	10	
3	26-27	4	4	1	3	4							12
5	26-28	6	8	7	18	14							47
9	26-30	3	14	8	14	12							48
3	26-34	4	11	2	6	5							24
6	27-33	5	10	8	12	10							40
23	28-30	2	38	4	12	10	7						71
1	28-34	5	2		3		4	1					10
2	28-36	2	1		2	2							5
1	29-130	5	3		1		1	1					6
7	29-33	3	3	12	1	9	6						31
12	30	2	10	3		12	4						29
15	30-31	2	12	3		12	4						31
Total 87			116	48	72	90	26	2					354

period as defined in the hitherto expressed view is in vain, if it take place out of the ovulation date or 3 days before it. *Knaus* and *Smulder* obtained the same finding. *A. G. Miller* reported the same observations on many cases, which will be shown in Table 13.

A. G. Miller reported the finding on a case which he had observed for one year as shown in Table 14.

Even in the findings observed by various authors, it is clear that the conception date accords with the ovulation period and the sexual intercourse only in the ovulation period or 3 days before it is effective for the bringing on of pregnancy, showing the duration of the fertilizing ability of spermatozoa to come within 3 days, or with 2 days according to *Knaus's* view. The previous theory concerning the optimal conception period, which is on the 7th day or thereabouts after the beginning of the menses, is definitely denied by my own and by other authors' recent observations.

9. Resume of this Chapter.

In all mammals except bats, in the physiological state, the period from the mating time to fertilization is within 2 days long and in experimental conception only copulation within 2 days before ovulation is effective for the bringing on of pregnancy. Monkeys are similar to human beings as regards the points that they have menstruation and that their mating time is not limited. Nevertheless they have ovulation period according with the conception period, the ovum being fertilized directly after copulation.

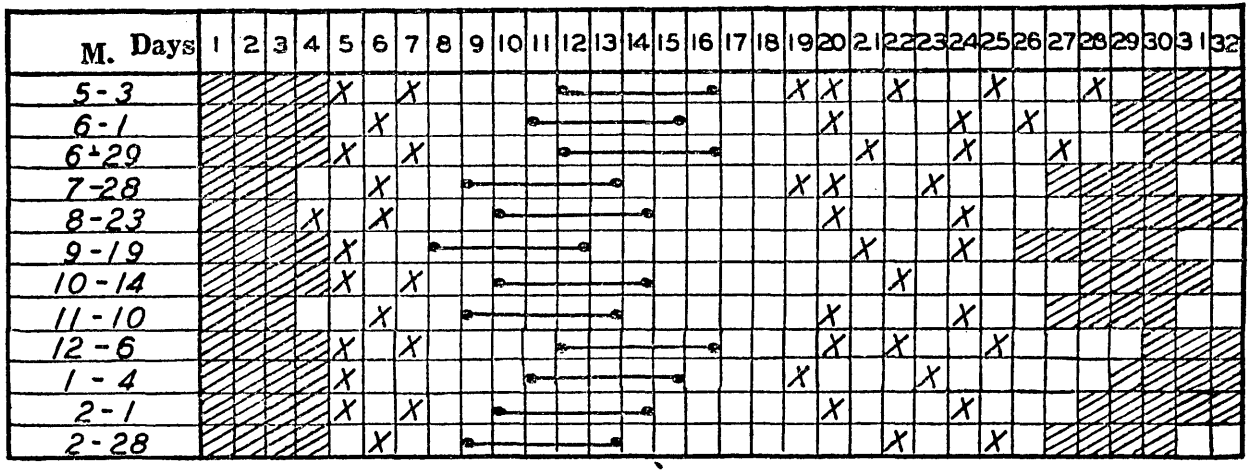
It is a fixed view among authors at the present time that the fertilizing ability of mammalian spermatozoa lasts up to 2 days.

According to the various authors' observations, the length of life of spermatozoa in the inside of female gonads is up to 3 days, being more than 4 days in quite exceptional cases.

It has also been experimentally proved that the mammalian and also human spermatozoa suffer a deleterious influence from the body temperature. Even if the length of life and the duration of the fertilizing ability of the different mammalian spermatozoa in the epididymis are remarkably different, it has also been made clear that the latter is severely impaired under the influence of the body temperature. Though human spermatozoa would live for 4 days or more or for 2 weeks, it is impossible to consider that the

Table No. 14

(A. G. Miller)



▨ = Menstruation ——● = Period of Conception X = Cohabitation

spermatozoa might retain their fertilizing ability for such a long time. *(Knaus)*.

From the above stated facts, we must conclude that the duration of the fertilizing ability of human spermatozoa is within a period of 3 days (according to *Knaus* within a period of 2 days).

In the literature on the subject, the long life theory of spermatozoa was entertained in order to explain the statistical findings concerning the conception period. However, it is denied by those facts that the optimal conception date is on the 7th day or thereabouts after the beginning of the menses, and on the contrary, it is made clear that human conception takes place as a result of the sexual act at the ovulation period or 3 days before it, but that sexual union before this time is in vain.

Consequently we may say that the duration of the fertilizable ability of human spermatozoa is within a period of 3 days. But I cannot say that human spermatozoa have also a 2 days fertilizing ability like mammalian spermatozoa, as *Knaus* says. Even if that be so, the evening 3 days before ovulation is 2 full days and 5-6 hours before it, and therefore from the practical point of view it is more convenient to consider that the duration of the fertilizing ability of spermatozoa is 3 days.

Is there no exception to the duration of the fertilizing ability of spermatozoa? Contrary to *Knaus*, who does not recognize any exception in its duration, saying that it is exactly 2 days. I think that there may be some exceptional cases as regards the duration of its ability, but that these are of no significance in practical life.

10. Conclusion.

The duration of the fertilizing ability of spermatozoa is within a 3 days period. I do not intend to deny that there may be some exceptional cases which are of more than 3 days duration, but I think from my experience that such exceptions have no practical significance.

CHAPTER V

THE HUMAN CONCEPTION PERIOD

1. My own view concerning the human conception period.

For the study of the human conception period, the fol-

lowing points are inevitable, namely, the ovulation period, the duration of the fertilizable ability of ovum after ovulation, and the duration of the fertilizing ability of spermatozoa in the female gonads.

In the second chapter it has been stated that the human ovulation period in the physiological state is in the five days from the twelfth to the sixteenth day before the forthcoming menses, notwithstanding the length of the menstrual periodicity, and that ovulation can occur at any time in those five days.

In the third chapter, the duration of the fertilizable ability of ovum after ovulation is set forth, it being shown that the fertilizable ability disappears if fertilization does not occur within from three to twelve hours. Consequently woman enters into the sterility phase from the next evening after ovulation.

As mentioned in the fourth chapter, conception can occur from 3 days before ovulation, because the spermatozoa in the female gonads retain their fertilizing ability for 3 days.

Human conception will occur only in the period of 3 or 4 days between the menses, and it is impossible to predict at which date within the five days from the twelfth to the sixteenth day before the next menses the ovulation may occur. Therefore the human conception period should be mapped out to be in the ovulation period and for 3 days before it..

It may be concluded as follows.

(a) The human conception period is in the eight days from the twelfth to the nineteenth day before the forthcoming menses, notwithstanding the length of the menstrual periodicity.

(b) The period of 11 days from the first to the eleventh day before the subsequent menses is the sterility phase. (Premenstrual sterility phase.)

(c) The period preceding the 20th day before the succeeding menses, that is to say, the period from the beginning of the last menses to the twentieth day before the next coming menses should be deemed as the sterility phase, if we disregard the quite exceptional cases. (Postmenstrual sterility phase.)

I have already published this theory in 1924 concerning the human conception period, in a Japanese medical journal and in a German journal in 1930 and 1932, and have come

to believe more and more in the truth of this biological law as the result of further observations.

2. Knaus's view concerning the conception period.

Regarding the human conception period, *Knaus* reported in 1929 the following conclusion, namely, that the conception date is in the 7 days from the eleventh to the seventeenth day after the beginning of the menses, if the menstruation cycle is of the 28 days type, it being independent of a change up to a few days, because such a change is deemed to be physiological. The basic point of his theory lies in the following findings, namely, that the fertilizable ability of the mammalian ovum lasts only for a few hours or up to one day; that the fertilizing ability of the spermatozoa of mammals, which have scrotal testicles, lasts only up to 2 days in the female gonads, and that the human ones should be regarded as the same; that the estimation of the ovulation period by his own method. This depends on the fact that the corpus luteum hormon inhibits the excitability of the uterine muscles to pituitrin, and by his method he found that the ovulation period was in the 3 days from the fourteenth to the sixteenth after the beginning of the menses in the case of the 28 days menstrual type. In that report, *Knaus* described only results obtained on a conception period of the 28 days type. But in 1931, he communicated his view on the optimal conception period, which is from the ninth to the seventeenth day after the beginning of the menses when the menses have the 26-30 days type of periodicity.

In 1933, he came finally to the conclusion that the *human conception period is in the five days from the thirteenth to the seventeenth day before the subsequent menstruation regardless of the length of the menstrual cycles.* The period in this theory is 3 days shorter than mine (8 days from the twelfth to the nineteenth day before the succeeding menses). In his report, the ovulation period is on the fourteenth day before the subsequent menses. However, as stated in the second chapter, the ovulation period is not limited to one day such as the fourteenth day, but can occur in the five days thereabouts. As mentioned above, even if there is a certain discrepancy between *Knaus's* views and mine, yet they contradict the hitherto expressed views concerning the conception period.

3. Comparison of my own and the views expressed hitherto.

Taking up the 28 days cycle of menstruation as an example for the comparison of my own and the hitherto

expressed views concerning the conception period, there is in the previous views no sterility phase of the woman, and the optimal conception period is on the 7th day or thereabouts after the beginning of the menses. On the contrary, according to my own view, the human conception period is in the time from the 10th to the 17th day after the menses have begun in this menstrual cycle, and the optimal conception period, according to the hitherto expressed view, coincides with the sterility phase in my own idea. Furthermore, conception would occur in the premenstrual phase, even if it would be in a low percentage according to the former view, but the period from the 18th day after the beginning of the menses in the 28 days cycle is the sterile phase according to my own view.

Knaus also denied fundamentally the hitherto expressed view with nearly the same idea as I have, even if there is a slight difference in some periods. *Ogino's* and *Knaus's* new theory concerning the conception period is diametrically the reverse of the old theory, which has been established on the experimental facts obtained by previous authors, and on the facts traditionally believed in. If anyone would make any criticism of the new theory, it is necessary for him to free himself from the fixed idea that the old theory has been established by experimental findings.

4. Opponents.

There are some opponents, especially *Wittenbeck, Meixner, Fraenkel, Kräuter, Van de Velde, Max Hirsch, Groesser, Bolaffio and Geller,* who published views opposing mine or opposing *Knaus's* theory. If I may be allowed, I can point out the weak points in these objections as shown in the following:

(a) The majority of the opponents have believed the old theory to have been established by statistics concerning the conception period derived from experimental facts. It is a weak point. If they will carry on the reexamination under my directions, there is no doubt that they will change their views.

(b) Though the opponents believe in the existence of provoked ovulation, it is nevertheless only a hypothesis for the explanation of the old theory. I cannot find a single case of provoked ovulation in human beings, as stated in the second chapter.

(c) Even if some among the opponents believe in the

long life of spermatozoa, it is not a verified finding, as described in the fourth chapter.

(d) *Bolaffio* opposed the new theory with his own statistical findings at the time of the great European War, but I can point out the weak points in his so-called 20 certain cases.

(e) Though *Geller* said that the clinical observations obtained from his patient's account were not in accordance with the new theory, yet there are certain weak points in the exactness of the patients' accounts and also in their memory. Therefore it becomes necessary to adhere exactly to my theory, if any one will reexamine it or apply it in practice.

This is only a brief description concerning the weak points in the opposing authors' theories, which I have gone through without finding any necessity to change my own view.

5. Supporters.

Since 1930 *Smulders* has re-examined Ogino-Knaus' theory and confirmed it, reporting the minute records in a few cases in the Dutch Medical Journal, and he earnestly supported this new theory in his book "Die periodische Enthaltung in der Ehe."

Remmelts (Java) made a critique with the findings on 20 cases, and published affirming views.

Boltzer (Tübingen) wrote to me that he had re-examined and affirmed my theory on five cases.

According to *A. G. Miller's* communication, 9 cases with a known conception date were all in accordance with their own conception period, and in 86 cases the sterility phase was recognized, the author reporting sexual union carried out 354 times in the postmenstrual sterility phase, and 371 times in the premenstrual sterility phase, all without pregnancy supervening. In June 1933, he wrote to me that in 126 cases there has been no pregnancy as a result of sexual intercourse on 1429 occasions, it having in all cases taken place in the sterility phase.

Guchteneere affirmed this new theory on 43 cases, and *Wohlers* on 160 cases. But I regret that I had no opportunity of reading their original reports.

As *Albrecht* saw only 2 discordant cases among 73 under clinical observation, he recognized *Ogino-Knaus's* theory, namely, that in the menstrual cycle there occur a conception

and a sterility phase as shown in the following cases.

(a) In 2 cases which the doctor observed himself over one year, sexual union during the sterility phase was practised without pregnancy supervening, and on the contrary, when it was practised in the conception period, it brought about pregnancy as *Knaus* stated.

(b) In 18 women, who had pregnancy without menstruation after their marriage, the date of their marriage accorded with the conception period or before it.

(c) Eleven women, who were married after the conception period, all had one or more menses courses before their first pregnancy.

(d) In 16 cases with known pregnancy dates there are 5 not in accord with *Knaus's* theory, but 2 cases among those 5 were in accordance with *Ogino's* conception period, and the other one will be proved to be a case in which the menses course was postponed.

(e) Twenty-six women, who had sexual intercourse only at the conception period, all became pregnant within half a year at the latest.

In reply to *Geller's* report, which was somewhat in opposition to the above mentioned communication of *Albrecht, R. Schroeder* in 1933 said before the German Gynaecological Society, that the sterility phase exists naturally without a doubt.

Georg wrote "Eheleben und natürliche Geburtenregelung". *P. Familias* wrote "Veel of wenig Kinderen naar Verkiezing", and *Latz* wrote "The Rhythm". As all these authors recommended the new theory, therefore they are considered to have acknowledged it. *Hartman* expressed his view in the critique on *Latz's* book, that he is in accord with the new theory.

Up to the present, there are at least 500 cases which are in accordance with the new theory, and there are very few not in accordance with it. As mentioned above, the new theory stands directly opposed to the old theory, and consequently, if the new theory is proved to be true, the old theory should be erroneous.

6. Conclusion.

As in the sexual cycle of mammals, there is a sterility phase and a conception period, both phases also are to be seen in the human menstrual periodicity.

The human conception period is in the 8 days from the

12th to the 19th day before the subsequent menstruation, notwithstanding the length of the menstrual cycles.

CHAPTER VI

METHOD FOR ESTIMATING THE CONCEPTION PERIOD.

1. Preface.

The human conception period is in the 8 days from the twelfth to the nineteenth day before the subsequent menses, as stated in the conclusion of the previous chapter, nevertheless it would be too hasty for any one to consider that this biological law can be easily and simply applied in practical life, because it is rather difficult to foretell at what time and in which cycle the subsequent menstruation will come. In order to ascertain the date of the next menstrual flux, there is nothing to guide us but an estimation made from the periodicity of the past menstrual cycles. Therefore, for the estimation of the conception period it is necessary to know exactly the past menstrual cycle.

2. Menstrual periodicity or menstrual cycle.

Menstrual periodicity means the number of days from the 1st day of the beginning of the menses to the day previous to the beginning of the subsequent menses, 28 days usually being the standardized cycle. There are regular and irregular courses in the repetition of the cycles, the former being divided into several types, namely, the 28, 27 and 30 days type, etc. Even in the regualr 28 days course, the menses do not come always in just the same number of days, but sometimes take 1-2 days more *(Knaus)* or 1-3 days more *(Schroeder)*.

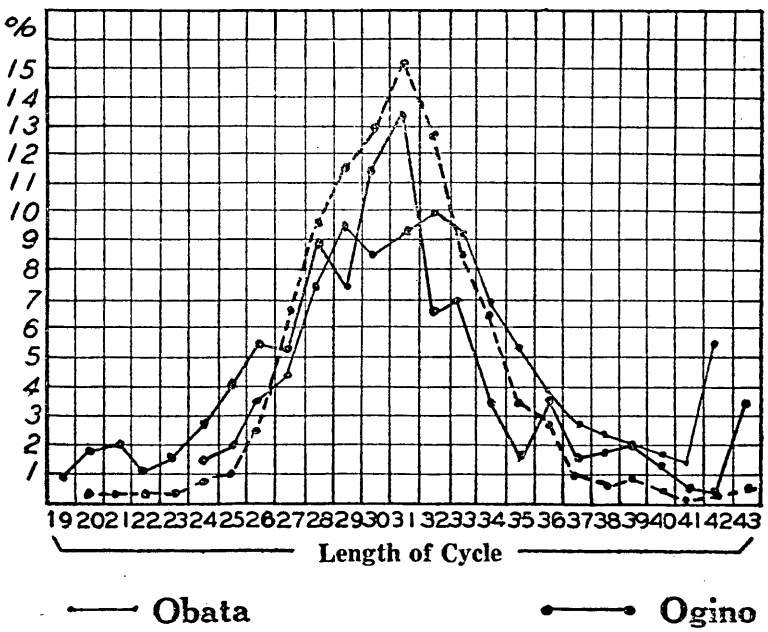
In the determination of the 2-3 days variation, there is a great difference between the comparison of 2 courses and 6 courses of menstruation. It is regarded in medicine and in everyday life that the menses will come always in a 28 days cycle, if the woman is of the 28 days type. It is necessary to emphasize that such a simple way of estimation is incorrect when it is a question of the estimation of the conception period.

In the following pages, I will show statistical findings concerning the menstrual periodicity, which will furnish reference material to readers for a good understanding on menstrual periodicity.

Though many statistics regarding the menses cycle of

Japanese women have been reported, in Table 15, I will show my own statistic relating to 883 occasions of the menstrual cycle in 694 healthy multipara women, *Obata's* statistic obtained from 959 female students and the statistic of the Journal of the Fujin-Koron (Feminine Public Opinion) relating to 1665 occasions of the menstrual cycle in normal women. These statistics are obtained by the re-

Table No. 15



cording of the beginning of 2 or more successive menstrual courses, but not from the stories of the patients.

As shown in Table 15, the majority of Japanese women are seen to have menstrual cycles at the 26-34 days type and the 31 days type is found most frequently.

Krieger found that in European women the 28 days type exists in the proportion of 70%, and the 30 days type in the proportion of 13%. *L. Meyer* found the regular menstrual cycle in 87% of 5146 women, this being of the 4 weeks type of menses. *R. Schroeder* also reported that four-fifths of women are of the 4 weeks type. It is assumed that in the

28 days type or 4 weeks type described in those reports, those with the 1-3 days variation are perhaps included. According to *Hajek's* report (1933), 82% of 1480 women are of the regular menstruation type, and 56% of 1215 of the latter are of the 28 days type, 10.2% of the 21 days type and 8.6% of the 30 days type. This is in striking contrast to *Foster's* statistics, for which he obtained the figures for 380 occasions of the menstrual cycle of 56 women, and he found the 28 days type occurring only 45 times.

There have been very few statistics concerning the variation days of the menstrual cycle. *Obata* reported his observations on the record of 3-10 occasions of the cycles. In his report, I will point out 960 female students who have had menses over a two years period, the moving limits being nearly fixed, as shown in Table 16.

As shown in Table 16, the menses cycles with a variation within 3 days are found only in 10% of cases, which

Table No. 16

Moving scope of Menses Cycle	o day = 0.7%
Moving scope of Menses under	3 days = 10.0%
Moving scope of Menses under	7 days = 30%
Moving scope of Menses under	10 days = 44%
Moving scope of Menses over	11 days = 56%

is a remarkably small number in comparison with European women, of whom 70-80% are said to have a regular menses course, if the 1-3 days variation is neglected. What is the cause of this? Though it may be considered that in the female students the ovarial functions are not perfect, yet the charts of menstrual periodicity of multipara women are almost similar to the student's ones as shown in Table 15.

According to my assumption, the moving date limitation in Japanese, American and European women would be much larger than 3 days, if the so-called regular menstrual course were observed for half a year or a year. There is a tendency to consider that the variation of menstrual periodicity would be short if any woman were to judge it by her own memory. Therefore it is necessary to make a men-

struation calendar in order to obtain an exact record.

3. Drawing up of the menstruation Calendar.

The menstruation calendar is a compass needle to show the flourishing or decline of function of the specific female organs, just as the fever chart is to disease. For example, the early or postponed coming of the first menstrual flux is dependent on the perfection or imperfection of the development of the female gonads. For a few years after the first menstrual course, the menses are mostly irregular, but thereafter they occur regularly. These findings, and also the developmental features of the gonads, are clearly shown by the menstruation calendar. Besides these, the findings from the menses calendar help in the diagnosis of gynaecological disease as follows: when the hitherto regular menses course becomes gradually irregular, the menstrual cycle being widened, there are several causes to be considered, and sometimes it may depend upon the development of tuberculosis; in a pregnancy case the calendar is used for the exact estimation of the scheduled birthday, instead of calculating from the 280th day after the beginning of the last menses, and the calendar is used for the diagnosis of extrauterine pregnancy, which is a very serious condition. To make earlier an exact diagnosis of any serious disease is the first safeguard against danger, and also helps to reduce the financial burden. If any one is observing the menses cycle by means of the menstrual calendar, he will not overlook the primary symptoms of uterine cancer, which is fatal to life, if one does not make a finding in the early stage. Thus the drawing up of the menstruation calendar is not only useful for the estimation of the conception period, but also for the carrying on of the hygienic life of women.

The method of recording the menstruation calendar is shown in Table 17 as a model for the estimation of the conception period.

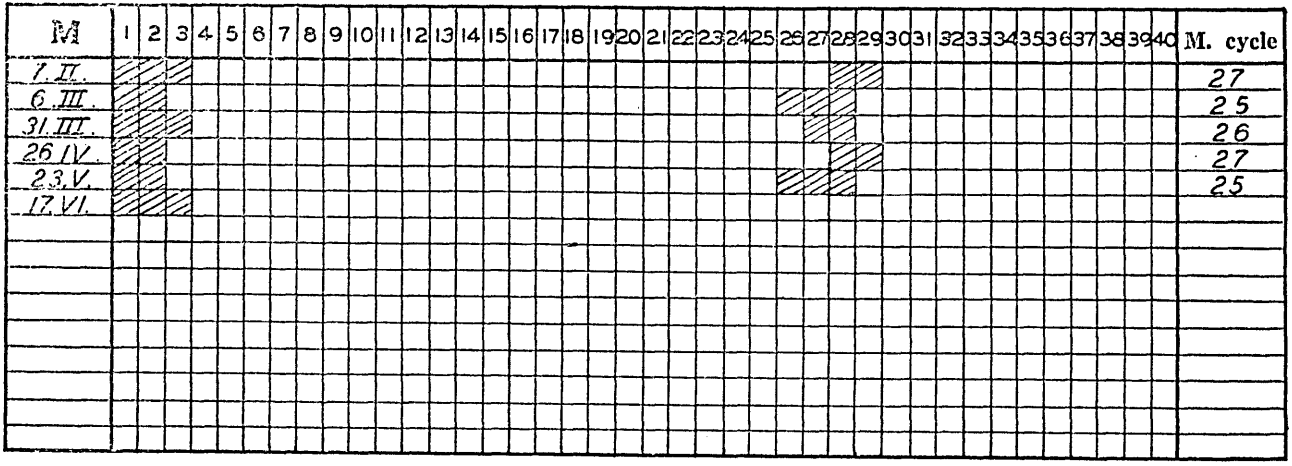
The figures for the reiteration of the menses cycles and variations, when the menstruation calendar is thus recorded, are shown in the Table 18, with the finding concerning the 2-3 cases.

Each case shown in Table 18 has a regular menses course as regards periodicity, and the moving dates are in 3, 4, 5, 6 and 7 days, if 12 occasions of the cycle are observed. If any one should ask when the subsequent menses will come in these cases, the following would be the answer:

(a) It is impossible to foretell *with absolute exactness*, in which cycle the subsequent menses will come, and also

Table No. 17

Record of Menstruation Calendar



▨ = Menstruation

no assumption is *absolutely* exact, even if a certain variation be overlooked.

(b) There is a certain practical authenticity in an assumption that the subsequent menses may come along in the minimal or maximal cycle among the recent 12 cycles.

(c) Contrary to this, an assumption based on the recent 2-3 cycles is not reliable.

4. Calculation formula for the estimation of the conception period.

The human conception period is in the 8 days from the twelfth to the nineteenth day before the subsequent menstruation, and if in each cycle the conception period is shown by the number of days after the beginning of the past menstruation, we get a table like Table 19.

Table No. 18

Knaus case	Knaus case	Knaus case	Miller case	Ogino case	30	26	27	Ogino case	28
					27	26	27		42
					27	27	27	II	45
I	III	V	I	I	28	28	27	23	27
28	30	31	29	31	25	26	27	25	31
29	31	28	28	29	27	27	27	21	Birth
28	36	30	29	28	27	29	25	29	29
29	34	32	26	29	27	27	28	55	40
27	32	31	27	26	27	27	31	Marriage	29
28	36	29	25	26	Birth	28	28	20	26
28	33	28	27	27	40	28	27	25	32
26	30	29	26	24	41	26	26	29	30
29	33	29	29	28	30	25	25	26	28
29	30	29	28	28	33	29	26	23	26
26		30	27	27	27	28	25	25	28
28		28	26	29	25	25	26	26	30
27				30	26	32	26	26	27
				28	27	27	32	27	25
				25	25	28	27	27	
				26	27	28	27	26	
				27	25	26	29	Birth	
				26	27	25	27	28	
				27	27	28	28		
				27		28	27		

Notwithstanding the length of the menstrual cycle, the conception period is in the 8 days from the twelfth to the nineteenth day before the subsequent menstruation. But if it is shown by the number of days after the past menstruation, it varies according to the length of the menses cycle; namely in the case of the 28 days cycle it is seen in the 8 days from the 10th to the 17th day after the beginning of the past menses; in the case of the 27 days one, it is in the 8 days from the 9th to the 16th day; and in the case of the 29 days one, it is in the 8 days from the 11th to the 18th day. Generally speaking. the conception period is in the 8 days from the 10th to the 17th day after the beginning of the last menses, when it is of the 28 days type, but if the cycle be shorter than 28 days, the period is as many days earlier as the number of days the period is shorter and if it be longer than 28 days, the period is seen proportionally later.

As it is difficult to foretell just along which cycle, minimal or maximal, among the recent 12 cycles, the subsequent menstruation may come, it should be considered that the conception period will begin with the first day of the conception period in the minimal cycle and will end with the last day of the same in the maximal one. Consequently the following is the calculation formula for the conception period in general.

The first day of the conception period =

10 + the number of days of the minimal cycle — 28

The last day of the conception period =

17 + the number of days of the maximal cycle — 28

The number calculated from this formula is in accord with the number of days after the beginning of the last menses. It is necessary to use the figures for the minimal and maximal cycle obtained from the last 12 cycles, not from just two or three, because the latter ones are not reliable. Several points concerned will be explained with a few examples as follows:

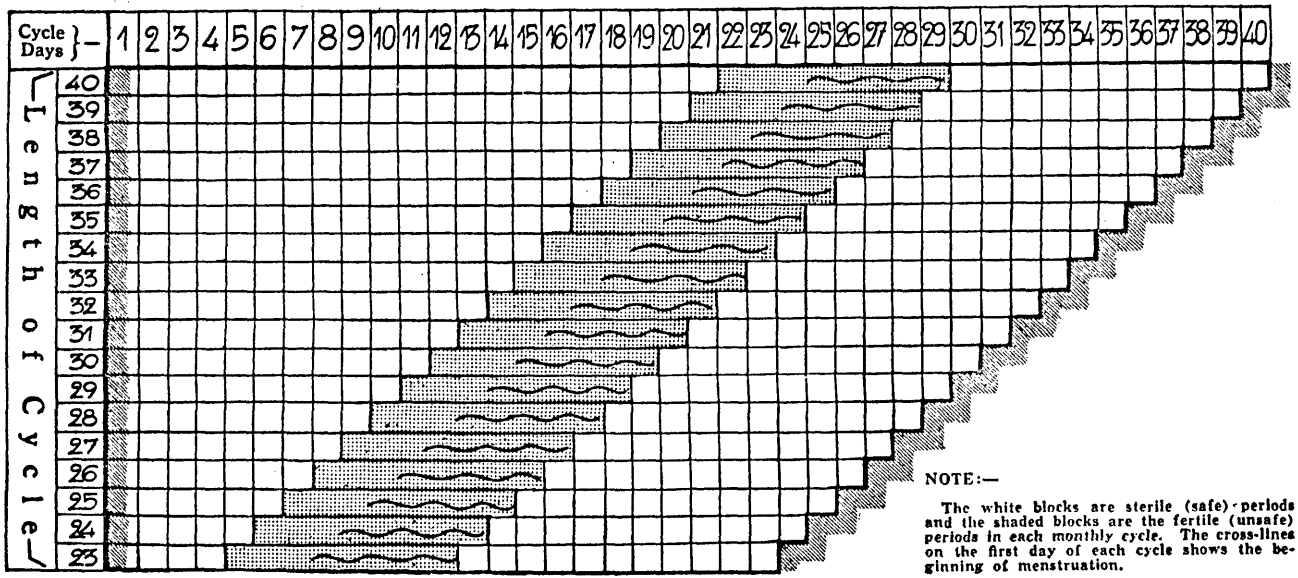
5. Estimation of the conception period when the previous menstrual periodicity has followed a simple course.

(a) Example 1. When the recent 12 menses cycles have been of the 26 days type, as shown by the menstruation calendar, it is a reliable assumption, that the subsequent menses will be of the 26 days type, and the conception period is as follows:

The first day of the conception period = 10 + 26 — 28 = 8.

Table No. 19

Graph Showing Various Cycles Whose Ranges are Between 23 to 40 Days



The last day of the conception period = 17 + 26 — 28 = 15.

Therefore the conception period is seen in the 8 days from the 8th to the 15th day after the beginning of the menses. As the date of the beginning of the last menses is known, it is easy to record on the calendar. If the beginning of the menses is on the 2nd of March, the date 8 days thereafter is the 9th March. The date 15 days after the 2nd of March is the 16th. Therefore the conception period is seen from the 9th to the 16th of March.

Example 2. If the recent 12 menses courses have been always of the 28 days type, the conception period is as follows:

The first day of the conception period = 10 + 28 — 28 = 10.

The last day of the conception period = 17 + 28 — 28 = 17.

If the date of the beginning of the menses is on the 2nd of March, the date 10 days after the 2nd is the 11th and the date 17 days after the 2nd is the 18th, and consequently the conception period is seen to last from the 11th to the 18th of March.

Example 3. The conception period of the 29 days cycle is 10 + 29 — 28 = 11, 17 + 29 — 28 = 18. If the first day of the menses is on the 2nd March, the conception period is from the 12th (2 + 10) to the 19th (2 + 17) March.

The above description is concerned to the recording of the conception period on the calendar, when the menses cycle is of the simple type. However, it very rarely happens that the cycle is repeated in such a simple regularity, and therefore it is of almost no meaning in practical life.

6. Estimation of the conception period, when the menstrual cycle has a so-called regular course.

Example 1. If in the last 12 menstrual cycles the minimal cycle is of 26 days duration, and the maximal one is of 30 days as shown by the calendar, the conception period is from the 8th (10 + 26 — 28 = 8) to the 19th day (17 + 30 — 28 = 19) after the beginning of the menses. If the menstrual flux begins on the 2nd March, the conception period is from the 9th to the 20th March as shown in *Table 20.*

Example 2. If a woman has a minimal cycle of the 27 days type and a maximal one of 32 days, her conception period is found to be from the 9th (10 + 27 — 28 = 9) to

Table No. 20

1934						March
Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
				1	2 M	3
4	5	6	7	8	9 C	10 C
11 C	12 C	13 C	14 C	15 C	16 C	17 C
18 C	19 C	20 C	21	22	23	24
25	26	27	28	29	30	31

C = Conception period

the 21st day (17 + 32 — 28 = 21) after the beginning of the menses, and if the menses begin on the 2nd March, the conception period is from the 10th to the 22nd March.

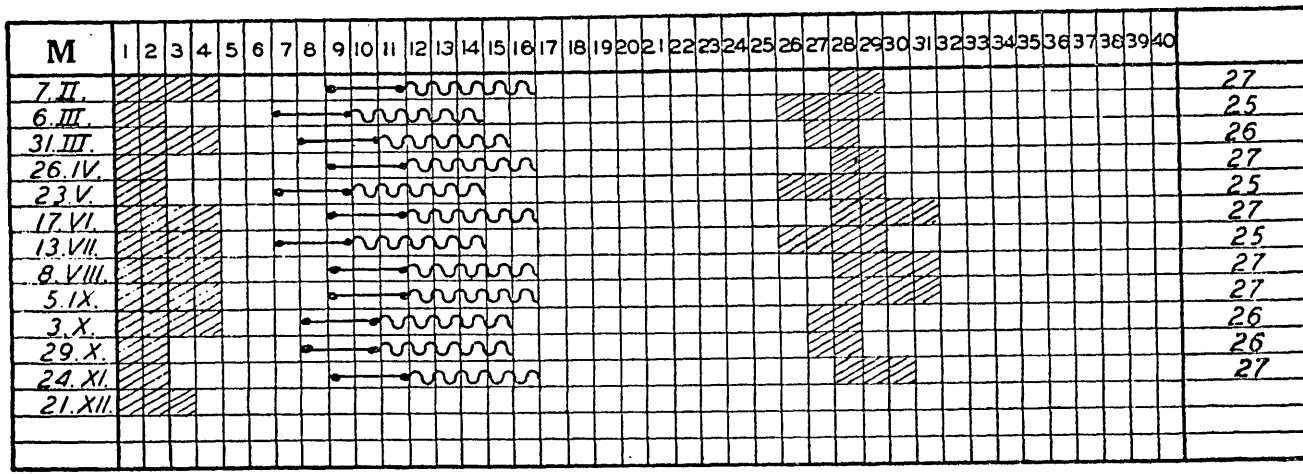
7. Estimation of the conception period when the menstrual cycle has an irregular course.

Example 1. When the minimal cycle is of 23 days and the maximal one of 36 days, the menses course is quite irregular and the conception period is from the 5th (10 + 23 — 28 = 5) to the 25th day (17 + 36 — 28 = 25) after the beginning of the menses. In this case, the subsequent menses may possibly come on a date when the conception period has not yet terminated; namely, earlier than the 25th day after the beginning of the last menses, if the cycle is shorter.

Example 2. When the minimal cycle is of 21 days and the maximal one of 45 days, the conception period is from the 3rd (10 + 21 — 28 = 3) to the 27th day (10 + 45 — 28 = 27), and therefore it will be clear that the conception period has already begun during the menses and will last until the 27th day after the beginning of the menses, and the last date will coincide with the day directly before the subsequent course if the cycle so eventuates.

Generally speaking, the conception period is 8 days

Table No. 21


M
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
7.II. 27
6.III. 25
31.III. 26
26.IV. 27
23.V. 25
17.VI. 27
13.VII. 25
8.VIII. 27
5.IX. 27
3.X. 26
29.X. 26
24.XI. 27
21.XII.
= Menses
= Conception period

long, when the cycle is simple. The larger the moving scope of the menses cycle is, the longer is the conception period, because it must be added to the difference between the maximal and minimal cycles.

8. **Prediction of the conception period by application of the menstruation calendar.**

The menstruation calendar in Table XVII can be used directly to obtain a conception calendar, namely, if the conception period of each cycle be recorded, the varying scope

Table No. 22

1934				March		
Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
				1	2 (M)	3
4	5	6	7	8	9 ○	10 ○
11 ○	12 ○	13 0	14 0	15 0	16 0	17 0
18 0	19 0	20 0	21 11	22 10	23 9	24 8
25 7	26 6	27 5	28 4	29 3	30 2	31 1

of the conception period may be predicted as shown in Table XXI.

9. **Smulder's method.**

Smulders described in his book "Die periodische Enthaltung in der Ehe" the method of directly recording the method of the conception period in a calendar as follows:

The date of the beginning of the subsequent menses, if it comes along the maximal cycle, will be pointed out in the calendar, and then the 8 days from the twelfth to the nineteenth day before its beginning will be marked on it, and moreover the number of days coinciding with the difference between the maximal and minimal cycles, namely, the variation number of the cycles in days, will be marked before these 8 days. Those marked days coincide with the conception period.

Example. In a woman who has a certain varying cycle

of from 26 to 30 days, and the beginning day of whose menses is the 2nd March, the conception period will be calculated in the calendar as follows:

As the beginning of the last menses is on the 2nd March, the beginning of the subsequent menses should be on the 1st April, if the maximal cycle comes about. Eight days from the twelfth to the nineteenth day before the 1st April are from the 20th to the 13th March, which days are marked in the calendar. The days coinciding with the difference between the maximal and minimal cycles are 30 — 26 = 4, and these four days are marked before the thirteenth March in the calendar, and consequently the marked calendar days are from the ninth to the twentieth of March, which will be regarded as the predicted conception period, as shown in Table XXII.

10. Estimation of the conception period, when one has no record of menstruation.

In order to know the conception period as exactly as possible it is generally understood that it is necessary to know the scope of variation of the menstrual cycles during the previous 12 occasions of menses courses. However, there are many women, who have no record of their menstruation, and therefore in these cases, the estimation of the conception period is not exact. Nevertheless, it is sometimes necessary to know provisionally the conception period until the the menstrual record is drawn up.

The scope of the menstrual variation is mapped out according to the person's memory and then the conception period is tentatively drawn up. But it is necessary to add 3-4 days before and after this provisional period. Needless to say, the accuracy of this provisional conception period depends upon the accuracy of the person's memory concerning the menstrual periodicity.

11. Summary.

In order to estimate the human conception period with certainty, it is necessary in advance to have drawn up the menstruation calendar, by which the moving scope of the menstrual cycle has been clarified, and then the scope should be determined by the minimal and maximal menses cycles in the previous 12 courses. The predicted conception period is from the 1st day of the conception period in the minimal cycle to the last day of it in the maximal one.

As estimating methods for the conception period, I have described the calculation method, the calendar recording method, and *Smulder's* method, all giving the same result.

THE METHOD OF APPLYING THE OGINO-KNAUS LAW

For the layman who wishes to obtain a quick working knowledge of the *Ogino-Knaus'* new biological Law of Nature, without devoting a great amount of time to reading the technical details, Tables A to H below and Table No. 19 in Chapter No. 6 have been prepared. The sum total of all the technical matter, for practical use, is presented in these tables.

Table A. The 23 Day Cycle

M1	2	3	4	F5	F6	F7
F8	F9	F10	F11	F12	13	14
15	16	17	18	19	20	21
22	23	M24				

Tabel B. The 24 Day Cycle

M1	2	3	4	5	F6	F7
F8	F9	F10	F11	F12	F13	14
15	16	17	18	19	20	21
22	23	24	M25			

M = First day of Menstruation.
F = The *Fertile or Conception* period in each monthly cycle.

Table C. The 25 Day Cycle

M1	2	3	4	5	6	F7
F8	F9	F10	F11	F12	F13	14
15	16	17	18	19	20	21
22	23	24	25	M26		

Table D. The 26 Day Cycle

M1	2	3	4	5	6	7
F8	F9	F10	F11	F12	F13	F14
F15	16	17	18	19	20	21
22	23	24	25	26	M27	

Table E. The 27 Day Cycle

M1	2	3	4	5	6	7
8	F9	F10	F11	F12	F13	F14
F15	F16	17	18	19	20	21
22	23	24	25	26	27	M28

M = First day of Menstruation.
F = The *Fertile or Conception* period in each monthly cycle.

Table F. The 28 Day Cycle

M1	2	3	4	5	6	7
8	9	F10	F11	F12	F13	F14
F15	F16	F17	18	19	20	21
22	23	24	25	26	27	28
M29						

Table G. The 29 Day Cycle

M1	2	3	4	5	6	7
8	9	10	F11	F12	F13	F14
F15	F16	F17	F18	19	20	21
22	23	24	25	26	27	28
29	M30					

Table H. The 30 Day Cycle

M1	2	3	4	5	6	7
8	9	10	11	F12	F13	F14
F15	F16	F17	F18	F19	20	21
22	23	24	25	26	27	28
29	30	M31				

M = First day of Menstruation.
F = The *Fertile or Conception* period in each monthly cycle.

In the 28 day cycle (Table F) the first 9 days (1 to 9) including the first day of menstruation are sterile or safe. The next 8 days (10 to 17) are fertile or unsafe. The next 11 days (18 to 28) are sterile or safe. Tables A to H show the same results as they appear on the graph in Table No. 19, Chapter No. 6.

TABLE No. 19 SHOWS HOW TO DETERMINE THE TWO PERIODS OF STERILITY AND FERTILITY FOR ANY REGULAR MENSTRUAL CYCLE. THE CYCLE RANGE OF WHICH IS BETWEEN 23 TO 40 DAYS.

1. Suppose the length of the cycle to be determined is 28 days, then in the left hand column of figures (23 at bottom and 40 at top) you count six rows from the bottom and you arrive at a 28 day cycle, then the first day with *"cross bars"* is the beginning of menstruation, reading from left to right, the first 9 days (1 to 9 inclusive) are sterile (or safe) then the next 8 days (10 to 17 inclusive) are fertile (or unsafe) then the next 11 days (18 to 28 inclusive) are sterile (or safe). Now refer above to Table F for a 28 day cycle. Here again you will note that 9 days (1 to 9 inclusive) are sterile (or safe) the next 8 days (10 to 17 inclusive) are fertile (or unsafe) and the next 11 days (18 to 28 inclusive) are sterile (or safe).

2. Suppose now the length of a cycle to be determined is 30 days, then you count 8 rows from the bottom of Table No. 19 and you arrive at the figure 30, then counting from left to right you find that the first 11 days (1 to 11 inclusive) are sterile (or safe) then the next 8 days (12 to 19 inclusive) are fertile (or unsafe) then the next 11 days (20 to 30 inclusive) are sterile (or safe). Now refer to Table H above and you will note that the first 11 days (1 to 11 inclusive) are sterile (or safe) then the next 8 days (12 to 19 inclusive) are fertile (or unsafe) and the next 11 days (20 to 30 inclusive) are sterile (or safe).

CHAPTER VII

RELIABILITY OF THE ESTIMATED CONCEPTION PERIOD

1. Theoretical views.

Readers will have already understood in the second chapter, on the ovulation period, that ovulation has a caus-

ative relationship to the subsequent menses, and that menstruation is the end, not the beginning, of the menses cycle. Consequently the ovulation period and the conception period have no relation to the past menses. There is therefore no *absolute* accuracy in the method for estimating the conception period, because the method is based on the state of the past menstrual periodicity.

2. **My own view obtained from practical observation.**

Even if the estimating method of the conception period has no *absolute* accuracy, still it is an error to deny its practical value. According to my own observations and those of many other authors, this method has so much accuracy that it is trustworthy in practice, but this accuracy does not apply in the case of all women, being different according to the individuality of the case and also to various circumstances.

3. **In the case when the menses cycle has a so-called regular course.**

In the case when the menses cycle has a regular course, I consider that the estimated conception period obtained from the moving state of the past 12 menses cycles is reliable in practice. In its practical reliability there may be found some exceptional cases.

It is rather difficult to determine the boundary line between the regularity and irregularity of the menses cycles, but I have used as the boundary a 10 days difference between maximal and minimal cycles during the recent 12 courses. Though a woman may say that her menstrual variation is within 2-3 days, yet there are sometimes found 7-10 days variation by observation of the 12 cycles.

4. **In the case when the menses has an irregular course.**

When the variation limit of the menstruation is over 10 days, it is tentatively regarded as an irreguar menstrual course. As the length of the predicted conception period is 8 + (the days of the maximal cycle—the days of the minimal cycle), the length will be increased proportionately with the irregularity and the practical value will be decreased. Moreover, if the irregularity be strongly increased, there may be a possibility of the appearance of an unexpected cycle, and consequently the estimated value will be decreased in its practical reliability.

5. **Lactation period.**

Women are usually without menses for about a year

after giving birth, though a few may have menses as early as one month thereafter. In the latter case the menses course is generally perfectly irregular and therefore the tentatively estimated conception period for this time has almost no practical value, even if it should be calculated from the findings on 2-3 courses.

6. In the case, when a woman has suffered from serious illness or remarkable change in her own life.

In this state it is well known that an unexpected menses course may appear and therefore the estimation of the conception period is not reliable, notwithstanding the state of the past menstrual cycles.

7. Psychological stimulus, namely, anger, terror, anxiety, sorrow, etc.

As from olden times it has been traditionally believed that psychological stimuli, such as, anger, terror, anxiety and sorrow, may have a certain influence on the menses course, it being hastened, delayed or stopped, it might be well to pay some attention to those cases. However, I may say that I have important statistics on women who suffered from the effects of the recent great earthquake, and whose menses were not influenced.

CHAPTER VIII

THE SIGNIFICANCE OF PREDICTION OF THE CONCEPTION PERIOD IN PRACTICAL LIFE

In the previous chapter, I have described various authors' views concerning various biological phenomena which are carried on in the female gonads in a certain periodicity or rhythm, having causative relationship to each other, and I have explained that the relation between fertility and sterility follows a certain biological law, being in accord with other biological phenomena in a certain cycle rhythm, which is contrary to the views expressed hitherto, but has recently been recognized by many authors. Moreover I have recommended an estimation method for the conception period. In the present chapter I will briefly describe in conclusion the significance of prediction of the conception period in practical life, from the doctors' standpoint.

1. For the woman who desires to have a child.

According to the new theory, the woman has a certain

limited conception period, which varies individually in its length according to the scope of menstrual variation. Sexual union outside this period has no meaning as regards the bringing on of pregnancy. It is also made clear that the fertilizing ability of spermatozoa is retained for only 3 days, and that the view expressed hitherto, that the optimal conception period is directly after the menses, is contradictory to the real facts. The above mentioned fact is not without significance to the woman who desires pregnancy.

2. Periodic liberation from a life of absolute abstinence.

A woman who is suffering from certain diseases, will have her life jeopardized by pregnancy. If the married couple or one of them suffer from certain kinds of hereditary disease, or have an abnormal constitution, it is not desirable for them to have children. In such cases it is necessary to carry out birth control from the medical point of view.

It is generally admitted that birth control is inevitably practiced when family life and happiness would be financially threatened by unlimited increase in the members of the family. In certain cases, there is nothing else to do but to live a life of absolute abstinence, because birth control methods are prohibited by certain religious bodies, as the various methods hitherto devised for birth control are all quite unnatural. This may make for real anguish in the married life. The new theory will be used by such people, who will be released from a life of absolute abstinence.

3. Periodic contraception.

Though Roman Catholics have declined to use the contraceptive methods devised hitherto, they have nevertheless been applied in practical life in other circles. Even though I do not intend to discuss whether those methods are right or wrong, they are quite unnatural from the medical point of view, and they are not without psychological and somatic harm.

By applying this new theory, the people who have carried on these unnatural contraceptive methods are liberated from their restriction, returning to their own natural married life.

4. Idealization of married life.

Just as the peace between two nations is maintained by mutual good understanding, it is hardly necessary to say

that the peace of a married couple is created by profound mutual understanding.

In the female body, various biological, periodical waves are carried on harmoniously following the menstrual cycles, as stated above and in some women there are found psychological stability and unstability phases coincident with those waves. The latter phase is observed from the premenstrual period until the menstruation time, and those affected are seen to be sensitive and excitable at that time. To have a good understanding of such psychological periodical changes is useful for the maintenance of the peace of the married couple.

A woman has a fertility and a sterility phase, these alternating periodically. The former period is a holy time, at which the life of new sons and daughters will be created. Thus will the married life be idealized and sanctified.

If the married couple will try to understand such psychological and physical periodical changes and keep in harmony, there will be no occasion to feel monotony and languor.

As stated above, I have expressed my own idea on the meaning of the estimation method of the fertility period, from the medical point of view, and I will be gratified if this description has contributed to the information of readers.

At the end of my paper, I wish to pay respects to *Prof. Knaus,* who had independently made a great contribution to the problem of the conception period, and I must acknowledge the kindness of *Dr. J. N. J. Smulders* who took the initiative in testing and confirming my own view, his work attracting general attention. *Dr. A. G. Miller, Dr. Guchteneere, Dr. Albrecht* and many other authors have investigated and affirmed the new theory, which has now been generally recognized. The new theory is founded on the basis of many biological phenomena, discovered by many authors, to whom I wish to pay my sincere respects. I wish to express my gratitude also to the Medical Arts Publishing Co. of Harrisburg, Pa. (U. S. A.) for its good will in the publishing of this paper.

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NOTE—The names listed above in ITALICS and those in the body of the book are all Doctors of High Standing in the medical profession. (No. 7 excepted.)

The following article by Drs. Miller, Schulz and Anderson, which was published in June 1933 issue of Surgery, Gynecology and Obstetrics, the official journal of the American College of Surgeons, is reproduced by permission. It shows the results of clinic observations of eighty-seven couples with twelve different menstrual cycles, eight different nationalities and seven hundred twenty-five cases of cohabitations and not a single case has resulted in pregnancy. This article is referred to in part, in the text of the book. However, the publisher realizes that many married couples will want ample and authoritive proof of the Ogino-Knaus method before applying it in their own family life. Hence, the reason for the publication of the entire article.

THE CONCEPTION PERIOD IN NORMAL ADULT WOMEN

A. G. Miller, M.D., C. H. Schulz, M.D., D. W. Anderson, M.D.
Miller Clinic, Hobart, Indiana

The epoch making work of Aschheim and Zondek has definitely shown that hormonal secretions play a prominent role in pregnancy. These hormones are derived from the ovary and the pituitary gland and bear a direct relationship to ovulation, fecundation, and menstruation. Recent investigation indicates that there are seven distinct hormonal effects from the pituitary gland and two from the ovary. The effects from the pituitary gland are:

1. The anterior lobe.
   a. An effect causing ripening of the graafian follicle with the production of folliculin and egg cell (1).
   b. An effect which causes growth of the corpus luteum after ovulation (2).
   c. An effect which in conjunction with the corpus luteum causes hypertrophy of the mammary glands (3, 5, 11, 13, 18, 24).
2. The posterior lobe.
   a. An effect causing uterus stimulation (12, 13, 18).
   b. An effect causing expansion of melanophores (35).
   c. An effect causing antidiuresis or water retention (32).

d. An effect causing increased blood pressure (9).

The effects from the ovary are:

a. Folliculin which causes hyperæmia of the uterus and tubes in preparation for the egg cell (7).

b. Corpus luteum which produces further growth of uterus and hypertrophy of mammary glands (6, 8).

Ripening of the graafian follicles with the production of *folliculin and ovum is brought about by an anterior pituitary* hormone. Folliculin causes hyperaemia of the uterus and tubes. When the follicle bursts the corpus luteum spurium is formed and this body in turn causes further growth of the uterus and hypertrophy of the mammary glands. If the egg cell is not fertilized the corpus luteum withers and dies and menstruation takes place. If the fertilized egg is implanted the corpus luteum spurium develops into the corpus luteum gravitatis, which maintains pregnancy and when it begins to wither the posterior lobe hormones re-assert causing rhythmic contractions of the uterus and labor. These reactions are shown by Figures 1 and 2 (13, 14, 15, 30).

Different scientists have shown that the life of the human egg cell is 1 day (18, 24, 34) and that of the sperm cell is 2 to 3 days (18, 24, 36). Also that in a normal regularly menstruating woman with a cycle of 28 to 30 days, ovulation occurs between the fourteenth and sixteenth days (18, 24), and that 10 days are required for the passage of the egg cell through the fallopian tube (18).

Henle has definitely shown that spermatozoa are able to travel a distance of 1 centimeter in 3 minutes (37). That human spermatozoa may reach the fallopian tube in a very short time after being deposited in the female genitalia, there can be no doubt, as shown by the following case, which we observed:

Mrs. B. M., age 25, i-para; diagnosis, dyspareunia, prolapsed uterus. In this case the last coitus was 65 days previous. Examination of vaginal and cervical secretions did not show the presence of spermatozoa. Copulation was had at 8 a. m.; 2 hours later at laparotomy examination of fallopian tubes revealed the presence of numerous spermatozoa.

If the duration of life of the egg and sperm cell is known, as well as the rate of sperm cell motion, the next question which confronts us is: When is the egg cell liberated?

Knaus, by means of a manometer noted that there was increased uterine pressure following the injection of posterior lobe pituitrin due to uterine contractions and that when corpus luteum was present the uterus did not respond by contractions (36). In this manner he was able to de-

termine the time of ovulation. This he found to be in the 28 day cycle of menstruation on the fourteenth to the sixteenth day before the next menstruation (18, 24). From these facts it is evident that in a 28 day cycle the corpus luteum spurium functions for about 14 days, when implantation of a fertilized egg occurs the corpus luteum spurium is changed to corpus luteum gravitatis, or if fertilization and implantation do not occur it withers and dies and menstruation is brought about. On this view pregnancy is not a hit and miss affair, but is regulated by the meeting of the egg and sperm cell before one or the other has withered and died (18, 36).

Ogino, of Japan, studied this question by examining the coitus in relation to ovulation and noting its ability to fecundate. He arrived at the following conclusions:

1. For women regularly menstruating every 28 days the period of time the human sperm cell was able to impregnate the ovum was the 8 day period lying between the twelfth and the nineteenth days before the next menstruation or in other words, between the tenth and the seventeenth day after menstruation had

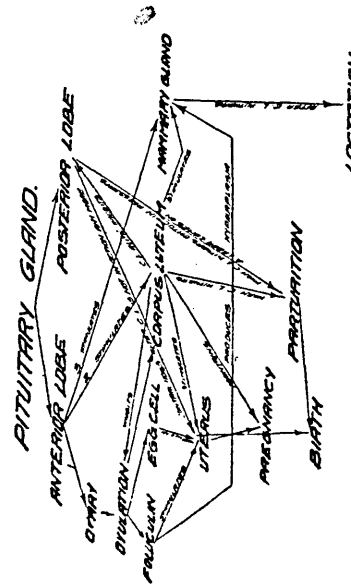


Fig. 2.

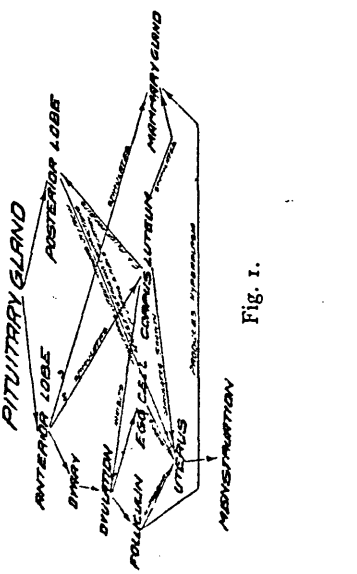


Fig. 1.

started, other days being physiologically sterile.

2. If the cycle is longer or shorter than 28 days the period of conception is moved so many days ahead or behind.

3. For those women who do not have a greater variation in the menstrual cycle than 10 days a formula for the period of conception could be stated as follows:

Beginning of conception is 10 plus cycle of minimum days—28.

End of conception period is 17 plus cycle of maximum days—28.

4. In computing the period of conception of any woman 12 menstrual cycles should be known, noting the maximum and minimum length of time of each. If the menstrual cycle should vary more than 10 days, then the formula is still theoretically correct, but of not much practical value (31).

Knaus, of Austria, working independently, arrived at similar conclusions, but elaborated them more fully as follows:

1. For women with a regular menstrual cycle of 26 days, conception possibilities are limited to the time from the ninth to the thirteenth days, inclusive.

2. For women with a regular menstrual cycle of 27 days, conception possibilities are limited to the time from the tenth to the fourteenth days, inclusive.

3. For women with a regular menstrual cycle of 28 days, conception possibilities are limited to the time from the eleventh to the fifteenth days, inclusive.

4. For women with a regular menstrual cycle of 30 days, conception possibilities are limited to the time from the thirteenth to seventeenth days, inclusive.

5. For women with a regular menstrual cycle of 34 days, conception possibilities are limited to the time from the seventeenth to the twenty-first days, inclusive.

6. For women with a regular menstrual cycle of 28 to 30 days, conception possibilities are limited to the time from the eleventh to the seventeenth days, inclusive, with the maximum of same at the fourteenth to the sixteenth days.

7. For women with a regular menstrual cycle of 26 to 30 days, conception possibilities are limited to the time from the ninth to the seventeenth days, inclusive, of the menstrual cycle.

For menstrual cycles of other variations, the conception period may be computed in the same manner as stated above. These calculations being true only for normal, healthy

women with regular variations in the cycle as stated above (16, 19 to 29).

Ogino established the time of ovulation in an empirical manner during the course of laparotomies on women. He has a 5 day ovulation period in a constant menstrual cycle.

Knaus determined the time of ovulation by measuring the uterine contraction by means of a manometer. He has a 2 day ovulation period in a constant menstrual cycle. It seems to us that Knaus' method is more definite and precise; therefore, we follow the doctrine of Knaus.

Based upon this initial research we decided to study this question by examining the coitus at various times to determine its ability to fecundate. Our material was chosen from 87 apparently normal couples including 8 nationalities and 725 copulations. Where pregnancy was thought to have occurred it was checked by the modified Aschheim-Zondek test on rabbits.

Our observations are as follows:

CASE 1. E. B., aged 36 years. Menstruation commenced at the age of 13, was of regular cycle, 28 to 30 days; duration 4 to 5 days. Patient was married at the age of 16 on the thirteenth day after previous menstruation; result pregnancy. For 5 years after birth of child, not desiring more children, various contraceptive methods as suppositories, douche powders, and pessaries were used. During the fifth year, while wearing a pessary, she became pregnant and aborted at the second month. At this time she was informed by a friend to abstain from coitus between the tenth and twentieth day of her menstrual cycle. This she practiced successfully for 13 years without the use of any contraceptive measures whatever, except accurately noting the dates on the calendar as well as duration of each cycle as the months went by. At the beginning of her fourteenth year of this procedure, she was informed that she must not figure from the first day of menstruation, but from the last. She accordingly changed her system The next and only coitus occurred on the fourteenth day from the beginning of the last menstrual period. Result: amenorrhœa, of 2 months. On the third day after the second missed cycle, the Aschheim-Zondek test revealed pregnancy. Ten days later, by self-induced means, she aborted a 2 months fetus. In this case the cohabitation date lies within the period of conception for her.

CASE 2. F. E., aged 28 years. Menstruation began at the age of 14 years, was occurring every 26 to 28 days, duration 4 days. She was married at the age of 21, the date being about halfway between two menstruations. Result, pregnancy. Following birth of child she developed a painful right ovary. Menstruation became profuse, 5 to 6 days in duration varying from 26 to 34 days. She was advised by her physician that another pregnancy might result in an operation being necessary so she used various contraceptive measures for 6 years. At this time, feeling that her procedure was correct, she adopted a son. Later she was advised that contraceptives were injurious and unnecessary, if she would abstain from intercourse between the eleventh to the seventeenth days of menstrual cycle. The previous 4 periods were as follows: 26, 30, 28 and 32 days in duration. The

only cohabitation during the month was on the nineteenth day after the beginning of the last menstruation. Result: amenorrhœa. The Aschheim-Zondek test proved the existence of pregnancy. This day lies within the dates of conception possibilities for her.

CASE 3. A. A., aged 25 years. Menstrual cycle varied from 29 to 33 days, duration 4 days. Last 4 menstruations were as follows: January 27, 1932, February 29, 1932, March 29, 1932, April 30, 1932. Only cohabitation on May 16, 1932, then amenorrhœa. The Aschheim-Zondek test on June 12, 1932, proved the existence of pregnancy. The cohabitation date in this case falls within the conception period for this woman.

CASE 4. A. R., aged 26 years. Menstrual cycle was 27 to 33 days, duration, 4 days. The last 5 menstruations are as follows: January 2, 1932, February 3, 1932, March 1, 1932, April 3, 1932, and May 4, 1932. Only cohabitation was on May 18, 1932. The next menstruation due to occur during the first week in June failed to materialize by June 16, on which date the Aschheim-Zondek test proved the existence of pregnancy. The cohabitation here is within the period of conception possibilities for this cycle.

CASE 5. A. N., aged 42 years, vi-para; 3 abortions. Menstrual cycle was 30 to 31 days. Last two menstruations were as follows: January 10, 1932, and February 10, 1932. The only coitus was on February 25, 1932. The following day her husband left home to seek work in a distant state and was gone 4 months. This woman did not menstruate during the next 3 months. Being in ill health and believing that she was entering upon the climacteric she consulted a physician. The Aschheim-Zondek test proved pregnancy was the cause of amenorrhœa.

CASE 6. W. E., aged 22 years, regular 26 to 28 day cycle menstruation. Confined on August 14, 1931. First menstruation postpartum was December 25, 1931. Next four as follows: January 22, 1932, February 17, 1932, March 16, 1932, and April 14, 1932. One coitus occurred on April 30, 1932. On May 14, 1932, Aschheim-Zondek test was positive for pregnancy.

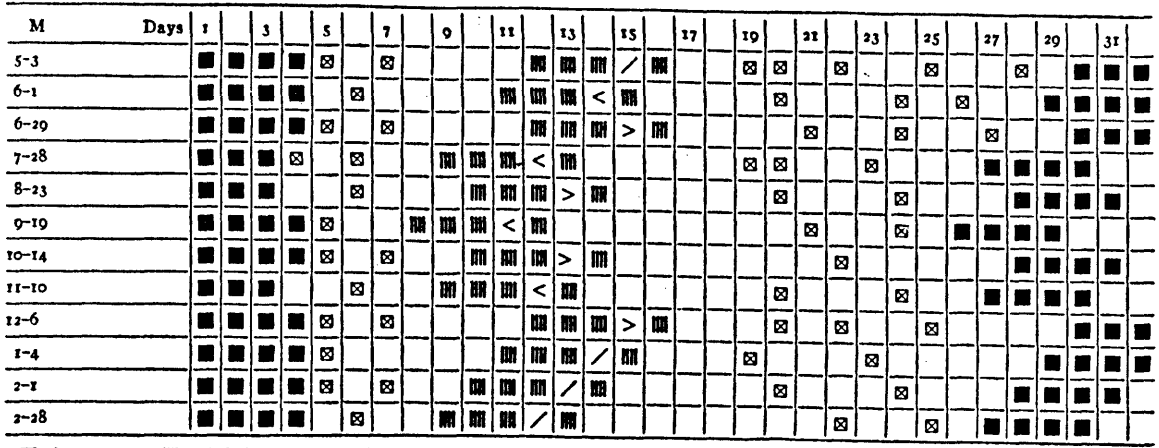
CASE 7. E. A., aged 21 years. Regular menstrual cycle 26 to 30 days. Last menstruation was on April 6, 1932. Cohabitation was on April 22, 1932. On June 11, 1932, Aschheim-Zondek test was positive for pregnancy.

CASE 8. A. B., aged 40 years, viii-para; menstruation every 26 to 27 days; duration 2 to 3 days. Last menstruation on August 10, 1931; cohabitation on August 21, 1931. On September 18, 1931, Aschheim-Zondek test was positive for pregnancy. In her case the conception date lies on the second days of the period of conception for her.

CASE 9. H. L., aged 35 years no children; regular menstrual cycle of 30 days, duration 5 days. Last period was February 29, 1932, cohabitation March 13, 1932. Result, pregnancy.

CASE 10. H. C., aged 21 years, on August 27, 1925 was confined. This woman believed that as long as she was nursing a child and did not menstruate that she could not become pregnant. Feeling secure in this belief no contraceptive measures were used. Eight months after her confinement, no menstruation having appeared as yet on October 12, 1926, she consulted a physician and pregnancy was diagnosed. She was again confined. In this case no menstruation occurred between the birth of the first child and the birth of the second child.

TABLE I.—CASE 1, A. F.



■ Menstruation. ▥ Period of conception. / < Maximum period of conception. ⊠ Cohabitation.

TABLE II

Cases	Cycle	Months	Days before next menses													Total
			13	12	11	10	9	8	7	6	5	4	3	2	1	
3	26–27	4							2	3	2	1	6	6	4	24
5	26–28	6						1	2	7		16		9	14	49
9	26–30	3							6	9	12			14	8	49
3	26–34	4								2	4	1	5	3	7	22
6	27–33	5								3	9	4	6	20	5	47
23	28–30	2			4			6			9		8		12	39
1	28–34	5											2	1		3
2	28–36	2									8	4	1	5	6	24
7	29–33	3								8		7	5		9	29
1	29–30	5			1	2		1	3	2		1	2		1	13
12	30	2			2		4		2			7		3	4	22
15	30–31	2			7		10		4	7	1		9		12	50
87					14	2	14	8	19	41	45	41	44	61	82	371

TABLE III

Cases	Cycle	Months	Days after menstruation												Total
			1	2	3	4	5	6	7	8	9	10	11	12	
3	26–27	4	4	1	3	4									12
5	26–28	6	8	7	18	14									47
9	26–30	3	14	8	14	12									48
3	26–34	4	11	2	6	5									24
6	27–33	5	10	8	12	10									40
23	28–30	2	38	4	12	10	7								71
1	28–34	5	2		3		4	1							10
2	28–36	2	1		2	2									5
1	29–30	5	3		1		1	1							6
7	29–33	3	3	12	1	9	6								31
12	30	2	10	3		12	4								29
15	30–31	2	12	3		12	4								31
87			116	48	72	90	26	2							354

COHABITATIONS REGULATED BY TIME WHICH DID NOT RESULT IN PREGNANCY

CASE 1. A. F., aged 27 years, i-para. This woman used the premenstrual and postmenstrual period of sterility for cohabitation. The details are shown in Table I.

In this case there were 48 cohabitations which did not result in pregnancy.

Eighty-seven cases consisting of 12 different menstrual cycles and 8 nationalities were studied for the period of physiological sterility. The details of this study are shown in Tables II and III.

Cohabitations before and after menstruations total 725 and not a single cohabitation of these two groups resulted in pregnancy.

SUMMARY

The anterior lobe secretion motivates the ovary. The corpus luteum inhibits the posterior lobe secretion and maintains pregnancy. When the corpus luteum withers the oxytoxic principle of the posterior lobe secretion asserts itself and labor is brought about. Fecundation is only possible when the sperm cell is properly timed to meet the egg cell.

CONCLUSIONS

1. Hormones play a major role in pregnancy.

2. The sperm and egg cells detached from their respective breeding places have a very limited time to live. For the egg cell it is not longer than 1 day. For the sperm cell it is 2 to 3 days.

3. Every normal regularly menstruating woman has a definite ovulation period.

4. Every normal regularly menstruating woman has a definite period of physiological sterility and a definite period of fertility in each cycle.

5. Cohabitation must be properly timed with ovulation if pregnancy is to result.

6. Pregnancy may be brought about or avoided at will by the observation of these two periods of time.

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